THE IRON TRADE REVIEW

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GREAT DEVELOPMENT

PLANNED BY REPUBLIC AND TENNESSEE INTERESTS IN THE SOUTH.

Amalgamation Will be Followed By Extensive New Construction.—Bright Prospects at Opening of the New Year.

Never has a year dawned with industrial conditions in a more thoroughly sound condition than are those of the beginning of 1906. So substantial is the prosperity that it does not seem probable that, for six months at least, even the machinations of the stock speculators, in which lies the only peril at present, can have much depressing effect on manufacturing interests.

While there promises to be steady progress this year in new construction in many parts of the country, the prospect of development in the south is especially bright. A large majority of the stock of the Republic Iron & Steel Co. and the Tennessee Coal, Iron & Railroad Co. is now held by men who, having become convinced of the great possibilities of the south, will make improvements more extensive than that section has ever witnessed. The amalgamation of the two companies will be effected in the not far distant future and the preparation of plans for the erection of new plants will soon follow. The labor problem is receiving careful attention from the Republic-Tennessee interests, and arrangements are being made not only to encourage migration of desirable laborers to the south, but also to insure their comfortable housing after they reach the sunny land, so that they will become permanent residents. Reports recently received from some of the new plants of Alabama have furnished positive evidence of the highly satisfactory results which can be obtained with up-to-date equipment, able management and intelligent labor.

Following the recent period of dullness, the pig iron market shows much strength, indicating that a heavy buying movement will soon set in. The strong demand for basic is a prominent feature, especially in the Pittsburg district and in the east. The minimum quotation of Bessemer is now $17.50 and several sales of 2,000 tons each have been made at $17.75. During December in the Pittsburg district from 65,000 to 75,000 tons of Bessemer were sold at about $17.60. There is a strong demand for foundry grades in the central west. Pipe interests are inquiring for 18,000 tons of iron for the first half. Ferro-manganese has made a new high record, a cargo of foreign having been sold at $175.00.

The American Sheet & Tin Plate Co. in 1905 shipped 1,050,000 tons of sheets and tin plates, which is within 150,000 tons of the theoretical full capacity of the plants. A previous high record was made in 1904, when 840,000 tons of sheets were shipped.

The outlook for structural material is excellent. Lake ship builders are again inquiring for plates for new vessels. The market for wire products is very strong.

Iron ore interests are now figuring on a production of 39,500,000 tons for 1906, an estimate 1,500,000 in excess of highest figures heretofore considered possible.

The American Bridge Co., has secured a contract for 20,000 tons of bridge material for the Northern Pacific Railway. Total sales for December were over 55,000 tons, making the total for the year over 500,000 tons, a new record.

Recent rail sales are B. & O., 71,000; Toledo & Ohio Central, 2,000; Vanderbilt lines, 73,000; trolley and miscellaneous, 15,000 tons. There is no reduction in inquiries for rails and indications are that 1906 will surpass everything in the past.

BUYING QUIETLY AT PITTSBURG.

(Special Telegram.)

PITTSBURG, Jan. 3.—During the last few days there has been considerable buying of pig iron in this district, some of the business closed being for round tonnages. Every effort has been made to keep these transactions quiet, as it was feared that its effect on the market, if made public at this time, would be to advance prices.

It is reported that the Steel Corporation has closed for 30,000 tons a month through the second quarter, but this cannot be verified. Interested parties say that the Corporation is negotiating for its uncovered requirements for the first quarter and that this buying will be completed within a few days.

LATE NEW YORK NEWS.

(Special Telegram.)

NEW YORK, Jan. 2.—Pig iron sales of the last few days have included 7,000 tons of foundry and forge grades, with inquiry excellent in all lines and prospects good for the placing of round tonnages within a short time. The structural business in sight is undiminished, although the builders have been somewhat nervous over the threatened strike of all the housesmiths in the district.

Although the directors of the United States Steel Corporation met last Thursday, a quarterly statement will not be issued at present, but will accompany the annual statement Jan. 30.

The Monarch Steel Castings Co., Detroit, is building in that city a steel castings plant 60 x 180 feet with one 15-ton O. H. Furnace, one 25-ton and one 10-ton traveling crane. The structure is of steel with brick side walls. W. C. McMahon is manager. This company recently acquired the Monarch Coupler Co. of Detroit.

THE WEEK IN IRON CENTERS.

PITTSBURG.

Very Strong Situation—Scarcity of Semi-Finished Material—Advance in Price of Light Rails.

OFFICE OF *The Iron Trade Review*,
521 PARK BUILDING, January 2.

With the close of 1905, which has been one of the most prosperous in the history of the iron and steel business, and with orders on the books or business assured for a large part of the new year, conditions are excellent, prices are firm, the inquiries on new business are good and mills are months behind on old contracts. The comparative quiet of the holidays is expected to be succeeded by a rush of business.

With these conditions producers have exerted their influence to prevent a runaway market, endeavoring to maintain fair prices and not take advantage of the situation which, if it took on boom proportions, might later react to the detriment of business generally.

The strength of the pig iron market continues to be the leading feature in this district. The deal for the purchase of a large tonnage by the Steel Corporation has been hanging fire on account of inability to agree upon prices, the feeling being that should a transaction of this size be put through at present market prices a sharp advance would immediately follow and it is this the corporation is trying to prevent, if possible. For first quarter delivery on Bessemer the absolute minimum is $17.50, valley furnaces, and it is extremely doubtful if this figure could be obtained except by old customers who would be favored. During the week a fair tonnage was sold at $17.75, valley furnaces, and this is being generally quoted. During December from 65,000 to 75,000 tons was sold at prices averaging from $17.60 to $17.65. Basic and foundry iron is also strong and there are several large inquiries out, among them one from the Massillon Iron & Steel Co., for 18,000 tons for first quarter delivery.

The scarcity of semi-finished material is being felt more than it was a month ago. As an indication of conditions the Carnegie Steel Co.'s Ohio works at Youngstown, on January 1 were changed to sheet bars and it is understood some companies are hard pressed and unable to secure an adequate supply. Among the large users of steel billets are several concerns which are themselves large producers but have sold on contracts and are now buying for their own consumption. Bessemer billets are now strong at $27 and as high as $27.50 has been obtained. The Carnegie Steel Co., has announced an advance in the price of light rails.

Pig Iron.—The strength of Bessemer pig iron is still the feature of the local market and a heavy buying movement is expected to begin at any time. One sale of 2,000 tons of Bessemer to eastern parties for first quarter delivery was made at $17.75, valley furnaces, and several smaller transactions were put through at the same price. It is possible that a favored customer might be able to get iron at $17.50, valley, but this is the absolute minimum and could not be secured on new business. During December between 65,000 and 75,000 tons of Bessemer iron was sold at prices ranging from $17.60 to $17.65, valley, but practically all new quotations are $17.75, valley. Several consumers have urged the furnaces to anticipate during January their February and March orders and this is being done in some instances. This is particularly true on malleable iron. The number of inquiries received by furnaces and brokers indicates the anticipated buying movement which will undoubtedly bring higher prices. We quote:

Bessemer Valley	$17.60 to 17.75
Bessemer, Pittsburg	18.45 to 18.60
No. 1 Foundry, Pittsburg	18.60 to 18.95
No. 2 Foundry, Pittsburg	18.25 to 18.45
Gray Forge, Pittsburg	17.10 to 17.60
Basic, Valley	17.45 to 17.60
Basic, Pittsburg	18.30 to 18.45

Ferro-Manganese.—We note the sale of a carload of foreign ferro-manganese, 80 per cent, at $175 per ton for immediate delivery and a small lot, less than carload, at the same price. A majority of dealers are entirely out of the market for prompt delivery.

Skelp.—Transactions during the week have been light and but little information can be secured. We continue to quote: Bessemer, grooved, 1.65c to 1.70c; sheared, 1.70c to 1.75c; basic, grooved, 1.65c to 1.70c; sheared, 1.70c to 1.75c; iron, grooved, 1.65c to 1.70c; sheared, 1.80c.

Muck Bar.—Under prevailing conditions we continue to quote $32 nominally, although we have heard of no sales during the past week.

Structural Material.—The holidays have had some slight effect on new contracts, but the specifications for both shapes and plates have been satisfactory and show no indication of any permanent falling off. The mills are running months behind. The open winter has been felt to some extent in that it permitted the continuation of outside work which, under different conditions, would have to have been postponed until spring. The contract

AVERAGE MONTHLY PRICES OF IRON AND STEEL PRODUCTS AT PITTSBURG, 1905

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Bessemer Pig Iron	$16.85	16.45	16.35	16.30	16.20	15.65	15.00	15.40	15.90	16.50	17.90	18.35
No. 2 Foundry, Northern	17.35	17.00	16.85	17.00	16.60	15.20	15.20	15.40	15.60	16.50	17.70	18.10
Gray Forge Iron	16.55	16.00	15.80	15.85	15.60	14.60	14.60	14.40	14.70	15.45	16.65	17.35
Bessemer Billets	21.00	24.90	24.60	25.50	23.50	22.00	22.00	23.50	25.75	25.95	26.30	26.50
Rails	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00
Beams and Channels	1.50	1.55	1.60	1.60	1.60	1.60	1.60	1.60	1.70	1.70	1.70	1.70
Tank Plate, ¼" thick, 6¼ to 14" wide	1.40	1.45	1.50	1.50	1.50	1.50	1.50	1.50	1.55	1.60	1.60	1.60
¼" thick, 14 to 100" wide	1.50	1.55	1.60	1.60	1.60	1.60	1.60	1.60	1.60	a	....	....
Steel Bars, Bessemer	1.40	1.40	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Bar Iron	1.65	1.65	1.65	1.65	1.60	1.55	1.60	1.60	1.65	1.75	1.90	2.05
Muck Bar	28.50	28.50	28.55	28.35	27.95	27.30	26.90	27.50	27.30	28.25	29.70	31.00
Iron Skelp, Grooved	1.70	1.75	1.70	1.70	1.70	1.60	1.60	1.55	1.60	1.60	1.70	1.70
Steel Skelp, Grooved	1.50	1.50	1.50	1.50	1.60	1.50	1.50	1.50	1.50	1.55	1.60	1.65
Sheets, No. 28	2.30	2.30	2.30	2.40	2.35	2.30	2.30	2.35	2.35	2.35	2.35	2.35
Tin Plate	3.55	3.55	3.55	3.55	3.55	3.50	3.50	3.40	3.40	3.30	3.40	3.40
Wire Nails	1.75	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
Iron Cut Nails	1.85	1.85	1.85	1.85	1.85	1.75	1.70	1.70	1.70	1.70	1.70	1.70
Ferro-Manganese	46.00	45.85	45.85	50.60	50.75	50.00	48.90	44.30	51.50	58.50	70.00	135.00
Furnace Coke, Ovens	2.80	2.50	2.50	2.00	1.90	1.85	1.80	1.85	2.00	2.70	3.00	2.85
Foundry Coke, Ovens	3.10	2.75	2.85	2.75	2.60	2.35	2.25	2.30	2.45	3.10	3.75	3.70

a—Differential removed.

for material for the erection of the new Commonwealth bank building, Pittsburg, amounting to between 3,000 and 4,000 tons, has been awarded to the Fort Pitt Bridge Co., under promise of the Jones & Laughlin Co., to furnish the material. We quote:

Beams and channels, 15 inches and under, 1.70c; over 15 inches, 1.80c; zees, 1.70c, 1.75c; angles, from 3 to 8 inches, inclusive, 1.70c; universal and sheared plate, 6¼ inch and wider, 1.60c, base.

Billets.—Bessemer billets are now quoted strong at $27 and 50c higher has been secured. Some concerns are still quoting $26.50, but this is nominal, as these concerns have none for sale and would not take an order to furnish them. An interesting feature in this connection is that among the heaviest buyers at the present time are companies which are themselves manufacturers of billets, but having contracted to the limit of capacity for outside use are now buying for their own consumption. Open-hearth forging billets are quoted at $33.

Plates.—Lake shipyards are again making inquiries for plates to be put into new ships on the lakes despite the fact that lake yards are practically filled for 1906 delivery. The steady pressure of specifications on contract continues unabated and mills are running to capacity.

We continue to quote Tank plate ¼ inch thick, 6¼ inch to 100 inches, 1.60c, f. o. b. mill, Pittsburg. Extras are as follows per 100 pounds: Flange and boiler steel, 10c; marine, A. B. M. A. and ordinary fire box, 20c; still bottom, 30c; locomotive fire box, 50c; plates over 100 inches up to 110 inches in width, not less than 5c extra; plates 110 inches to 115 inches wide, not less than 10c extra; 115 to 120 inches, not less than 15c extra; plates 120 inches to 125 inches wide, not less than 25c extra; plates 125 inches to 130 inches, not less than 50c extra; plates 139 inches wide, not less than $1 extra; plates 3-16 inch thick, 10c extra; gauges 7 and 8, 15c extra; No. 9, 25c extra. Five cents extra for less than carloads. Terms net cash in 30 days, and for all points of delivery in the United States except Pacific Coast.

Sheets.—The American Sheet & Tin Plate Co., during 1905 broke all previous tonnage records and it is officially announced that the shipments of sheets and tin plate during the year just closed were 1,050,000 tons, which is but 150,000 tons less than the theoretical maximum capacity which is 1,200,000 tons. The shipments in 1904 were 840,000 tons, which, until the year just past was the banner record. Both the leading interest and the independents who have not their own sheet and tin bar mills have suffered to some extent on account of the scarcity of semi-finished material. The placing of the Ohio Works, of the Carnegie Steel Co., Youngstown, on sheet bars will in a measure alleviate this condition which threatened to become acute.

We continue to quote unchanged: American Bessemer steel sheets box annealed, cold rolled one pass: Nos: 11-12, 1.90c; Nos. 13-14, 1.95c; Nos. 15-16 2c; No. 17-21, 2.05c; No. 22-24, 2.10c; Nos. 10-11, 2.25c; No. 12-14, 2.35c; Nos. 15-16, 2.45c; Nos. 17-21, 2.60c; Nos. 22-24, 2.75c; Nos. 25-26, 2. 95c; No. 27, 3.15c; No. 28, 3.35c. Corrugated roofings, 1.70c per square for No. 28, painted, 2½inch corrugation; 2.75c per square for No. 28, galvanized 2½ inch corrugation. Quotations f. o. b. Pittsburg for large lots.

Merchant Steel.—The specifications by makers of agricultural implements are extremely heavy and the railroads and car companies have been unusually heavy. The demand for shafting and tool steel has been strong and mills are working practically to capacity. We quote:

Cold rolled and ground shafting, 50 per cent off in carload lots, and 45 off in less than carloads, delivered in base territory; tire steel, 1.70c to 1.80c; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flat, 1.50c to 1.55c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.05c to 2.10c. The price of planished and machine straightened tire is 1.70c base half extras as below. Iron finished tire up to 1½ inch by ½ inch, 1.65c base half extra tire list. Iron finished tire 1½ inch by ½ inch and over to be sold on regular bar basis of 1.50c base, half extra steel card.

Pipes and Tubes.—Conditions remain unchanged and business in practically all branches is good. The advance in iron pipe made by a large independent maker two weeks ago has not been followed by other interests. We quote:

	Steel		Iron	
Consumers' Carloads	Black	Galv.	Black	Galv.
⅛ and¼ inch	71	55	68½	52½
⅜ and ½ inch	75	63	72¼	60¼
¾ to 6 inches	79	69	77	67
7 to 12 inches	74	59	72	56½
EXTRA STRONG PLAIN ENDS.				
⅛ to ¾ inch	64	52	61½	49½
½ to 4 inches	71	59	68½	56½
4½ to 8 inches	67	55	64½	52½
Double extra strong plain ends, ½ to 8 inches	60	49	75½	49½

MERCHANT BOILER TUBES, CARLOADS, 22 FEET AND UNDER.	Steel	Iron
1 to 1½ inches	44	41
1¾ to 2¼ inches	56	41
2½ inches	58	46
2¾ to 5 inches	64	53
6 to 13 inches	56	41

Less than carload lots two points less.
2½ inches and smaller, over 18 feet, 10 per cent net extra.
2¾ inches and larger, over 22 feet, 10 percent net extra.

Rails and Track Material.—The leading interest has announced an advance of $1 a ton on light rails effective at once. The demand for light sections has been in such volume that the advance was warranted, on account of the rush. We quote:

Fifty pounds and heavier, 500 ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; light rails, 16 pounds, $30; 20 pounds, $28.50 to $29; 25 to 45 pounds, $28; angle bars for standard sections, 1.50c; spikes, $2.

Merchant Bars.—There has been no change in condition or prices and but few transactions have been reported, a majority of local producers being out of the market and we continue to quote:

We quote: Common iron bars, 2c, Youngstown; 2.05c, Pittsburg; hoops, 1.85c in carload lots, and 1.95c in less than carload lots, with regular hoop card for extras. Bands, 1.50c; Bessemer steel bars, 1.50c; open-hearth steel bars, 1.50c; plow and cultivator, 1.50c, net; channels, angles, zees and tees under 3 inches, 1.60c all f. o. b. Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds, 10c advance; less than 1,000 pounds of a size, 30c advance.

Wire and Wire Nails.—Specifications during the last week in the old year were particularly heavy, but whether this may be attributed to actual needs and is indicative of specifications held in abeyance until the last week when deliveries could not be made before Jan. 1 and thus not come into the inventory of 1905 or whether it is in anticipation of the advance, is hard to determine. Prices during the past year held stiffer than for the past eight or nine years, this being attributed to the good business and it being unnecessary for the independents to make price inducements in order to get the business, there being plenty to go all around.

We quote: Wire nails, jobbers' carload lots, $1.80; retailers' carload lots, $1.85, and less than carloads, $1.95; painted barb wire, $1.95 for jobbers in carloads; retailers' carload, $2, and less than carloads, $2.10, with 30c for galvanizing; plain wire, $1.65 to jobbers and $1.70 to carload buyers. Annealed smooth fence wire is held at $1.65c with the usual differentials to retailers for carloads and less than carloads. Quotations are all f. o. b. Pittsburg,

60 days, with 2 percent discount for cash in 10 days. Iron and steel cut nails, $1.75 to $1.80.

Rods.—Rods are quoted nominally at $37 to $38 but there are few to be had at any price.

Old Material.—The scrap business, which has been to all intents and purposes lifeless for some time back, continues to be listless. It is reported that a sale of 5,000 tons of re-rolling rails has been made to one of the large interests, but this cannot be confirmed. While it might be difficult to obtain the prices quoted there is no substantial basis by which they could be reduced, transactions having been so light. We quote:

Heavy melting stock, $17.50 to $18; old steel rails, long lengths, $18 to $18.50; No. 1 cast scrap, $15 to $15.50; heavy cast scrap borings, $10.75 to $11; bundled sheet scrap, $15.50 to $15.75; No. 1 wrought scrap, $20.50 to $21; low phosphorus scrap, $20 to $21.

Coke.—Foundry coke for spot delivery is quoted from $3.40 to $3.50 and the same figures are quoted for first quarter. On furnace coke for spot delivery $2.65 to $2.75 is quoted and $2.85 to $3 for first quarter. The capacity of the Connellsville region will be largely increased in the spring by the addition of new ovens, construction now going on in all parts of the region, the Pittsburg Coal Co., alone having completed 150 of the 200 new ovens which will be in blast before February 1. A summary of production of the Connellsville region for the week ending December 23, shows a total of 23,313 ovens, with 22,168 in operation. The week's production amounted to 285,104 tons, an increase of 1,122 tons over the previous week. The shipments aggregated 12,279 cars, distributed as follows: Pittsburg district, 4,427 cars; west of Pittsburg, 6,552 cars; east of Everson, 1,300 cars. The shipments amounted to 294,608 tons, an increase of 4,676 tons over the previous week.

PHILADELPHIA.

Inquiries from Pittsburg for Basic—Strong Conditions Prevail in Pig Iron.

Pig Iron.—There is a distinctly buoyant feeling since the passing of the Christmas holidays, and the talk of higher prices, which was dropped for a time, is again heard. This feeling is the result not only of numerous inquiries and the requests of buyers to anticipate orders, showing that they are hardly keeping ahead of daily requirements, but also of a growing appreciation of the immense business that is sure to characterize 1906, due to the unprecedented demands of the railroads. The shipyards, structural builders and other large users of iron and steel. The open winter, which has proved so favorable to out-door work and the prompt transportation of both raw and finished material, has also added to the confident tone that marks the market. Basic iron is especially in demand, and Pittsburg, where the scarcity seems most felt, has made handsome offers in this market for needed supplies. It is not likely, however, that much will be allowed to go there, as eastern furnaces will have their hands full in meeting the demands of their regular customers. Some of these offers for basic have been at a considerable advance over the ruling figure of $18. Reports that come in of furnaces blown out for repairs show that the rapid pace of the past year is begining to tell, and that it will not do to rely too implicity on the full theoretical capacity of production. While slightly higher prices are looked for before long, no change has been reported during the past week, though it is probable that the outside range is being secured more frequently than before. Prices may therefore be quoted unchanged, as follows:

No 1X Foundry	$19.00 to 19.25
No. 2X Foundry	18.50 to 18.75
No. 2 Plain	18.00 to 18.25
Standard Gray Forge	16.50 to 17.00
Basic	18.00 to 18.25
Low Phosphorus	24.00 to 24.50
Southern No. 2X, rail	18.50 to 18.75

Finished Material.—The holiday season has had its natural effect in reducing the tonnage placed during the past week, but beginning again today, it is expected to resume the surprising dimensions of the past few weeks. The demand for bar iron is reported to be growing steadily, and premiums are asked for reasonably prompt delivery. As to rails, structural material, plates, etc., it is the old story of mills filled up with orders for the best part of the new year. The nominal figures remain unchanged as follows: Beams, channels and angles according to specifications, 1.82½c to 2.50c; refined iron bars, 1.75c to 1.85c; steel bars, 1.63½c to 1.83c; plates, 1.73½c to 1.83½c.

Old Material.—The unexpectedly long continuance of pleasant open weather, permitting the prompt transportation of scrap, has had the effect of making the market more disposed to weakness than is usual at this season of the year. The mills have not been large buyers, and dealers anxious to make sales can only do so at a concession. The result is that comparatively little is being done. If present conditions continue a break in prices may be looked for, but for the present they remain unchanged, as follows:

Old steel rails	$18.25 to 18.50
No. 1 steel scrap	18.00 to 18.50
Old steel axles	21.50 to 22.00
Old iron axles	28.00 to 28.50
Old iron rails	23.00 to 24.00
Old car wheels	17.50 to 18.00
Choice scrap, R. R. No. 1 wrought	22.50 to 23.00
No. 1 yard scrap	20.00 to 21.00
Machinery scrap	16.50 to 17.00
Low phosphorus scrap	22.00 to 23.00
Wrought iron pipe	16.50 to 17.00
No. 1 forge fire scrap	16.50 to 17.00
No. 2 forge fire scrap, ordinary	13.25 to 13.70
Wrought turnings	14.50 to 15.00
Axle turnings, heavy	15.50 to 16.00
Cast borings	10.50 to 11.25
Stove plates	13.25 to 13.75

CLEVELAND.

Strong Demand for Pig Iron—Estimate of Tremendous Ore Production—Furnaces Blown Out for Relining.

OFFICE OF *The Iron Trade Review*,
Browning Building, January 3.

Iron Ore.—In view of the heavy demands which a continuance of present conditions in the iron industry will make on the ore producers during 1906, estimates of the probable output are slowly climbing, and interests regarded as conservative are now of the opinion that the figure may reach 39,500,000 tons. The uncovered needs of many eastern consumers and scattered requirements of the west yet to be taken care of would insure the consumption of this tremendous tonnage, if trackage and car facilities proved adequate for handling that amount. Little buying is being done at present, though some small business is being closed for furnaces which have not enough on hand to run until the opening of navigation.

The Steel Corporation came into the market for 1906 tonnage on Tuesday and chartering was brisk on the same terms as during the past season. The tonnage contracted for, however, is by no means as heavy as was anticipated, and unless additional chartering is done later, the pro-

spects are that very much more wild ore will be carried this year than last.

Pig Iron.—The new year has opened with unusual activity and the holiday lull, which ordinarily is felt until well along in the month, disappeared promptly with the first business day. Inquiries are current for several heavy tonnages, chiefly for pipe and foundry purposes in this district. A large pipe concern in a neighboring city is in the market for 18,000 tons of iron, 1,500 tons each of No. 2, No. 3 and No. 4, either northern or southern, for January, February, March and April, and the contract will, in all probability, be closed before the end of the week. Other inquiries which have developed with the new year aggregate between 8,000 and 10,000 tons for later delivery. Two merchant furnaces, with a daily capacity of about 500 tons, were forced to blow out for relining early in the week, and will be out of running for at least five or six weeks. With other furnaces in the district hard-driven to supply the needs of their own customers, stocks in yards extremely low, and foundrymen continuing to clamor for anticipations on contracts, the outlook is that iron will be extremely scarce during the next two months. No sales are reported at prices above those which have prevailed for some weeks, but the market is extremely strong and already gives indications of approaching increases, with spot iron considerably higher and difficult to obtain. Foundrymen are still melting a larger tonnage than they anticipated, and are finding the securing of additional iron needed as troublesome a problem as ever; much first quarter business in this line remains to be covered. Southern iron is selling at $14.50 for No. 2 grade with quotations as high as $15.00. We quote Cleveland delivery, as follows:

Bessemer	$18.35
No. 1 Foundry	18.50 to 19.00
No. 2 Foundry	18.00 to 18.30
No. 3 Foundry	17.50 to 18.05
No. 2 Southern	17.85 to 18.35
Gray Forge	16.85 to 17.35
Gray Forge, Southern	15.85 to 16.35
Lake Superior charcoal	19.00 to 19.50

Finished Materials.—Activity has been continued in almost all lines through the holiday season, chiefly by final heavy specifications on expiring contracts, and the new business being booked is sufficiently heavy to insure the trade against any early dullness. Bar iron is selling at the full quotation price of the leading producer, 2c, Youngstown, and other interests are generally approaching that figure. Plate orders are crowding the larger mills, but the smaller plants with limited variety of output are not booked far ahead. Some premium business is being done. Sheets continue to improve and are now a strong feature of the market, with orders plentiful at the advanced schedule recently put in effect. A number of inquiries have developed recently for light rails, on which some contracts have been closed for prompt deliveries. Structural materials are still much sought, despite the practical cessation of building. Tool steel interests report increased business quite up to the improvement in other lines, with the certainty of an almost unprecedentedly heavy demand throughout 1906, largely as a result of prosperous conditions in the cotton district and the agricultural section of the northwest.

Old Materials.—Trading has been extremely light during the holiday season, with prices fairly successful in resisting all downward tendencies. Mills are well supplied for their immediate wants and are buying sparingly. Railway lists have been small and there is not a great amount stored in yards, the probability being that a touch of winter weather with a snow heavy enough to interfere with prompt shipments would occasion a general advance. Cleveland quotations continue without change as follows:

Old Iron rails	$25.00 to 26.00
Old steel rails (over 6 feet)	16.75 to 17.75
Old steel rails (under 6 feet)	17.00 to 18.00
Old car wheels	17.00 to 17.50
Steel boiler plate	14.00 to 15.00
Steel axles	21.00 to 22.00
Malleable iron (railroad)	16.50 to 17.50
Malleable iron (agricultural)	15.50 to 16.50
Heavy steel	17.00 to 17.50

We quote as follows, net tons:

No. 1 R. R. wrought	17.50 to 18.00
No. 1 busheling	15.00 to 15.50
No. 1 machine cast	13.75 to 14.25
Iron axles	23.00 to 24.00
Axle turnings	11.50 to 12.50
Wrought turnings (free from cast)	11.00 to 12.00
Grate bars	9.50 to 10.00
Pipes and flues	13.50 to 14.50
Tank iron	11.00 to 11.50
Hoop and band iron	8.00 to 9.00
Sheet iron	7.00 to 8.00
Wrought drillings	11.00 to 12.00
Stove plate	10.50 to 11.00
Cast borings	8.50 to 9.50

NEW YORK.

Pig Iron Market Active in Spite of Holidays—Good Round Lots of Foundry and Some Basic Sold.—

Pig Iron.—The week has been surprisingly active in pig iron circles, considerable business in both foundry and basic being done. Inquiries seem to show that melters are not by any means so well covered as had been anticipated. Several small lots were secured for immediate use under most favorable circumstances for economical delivery, and an inquiry for 500 tons spot from a large melter supposed to have been well supplied is still in the market. Basic continues to be scarce. One sale of a 1,000-ton lot of this grade is reported, and several large transactions are pending. The needs of the foundrymen are unusually pressing for this time of the year. There were sales of Virginia, Alabama, Pennsylvania and New York state iron, with negotiations for a 6,000-ton lot to be concluded within a few days. Virginia No. 2, 2,000 tons brought $15.50 at the furnace and 200 tons No. 1 for quick shipment sold at $17.25. A lot of 1,000 tons No. 2 Alabama was placed on a basis of $14.50. A lot of 1,000 tons of No. 2 X Pennsylvania, brought $17.75. Two lots of ferrosilicon were sold at a good round price, also several small tonnages of other special irons. Spiegel and ferromanganese are still held at famine prices, but no business of importance has come to the surface. The contracts for laying some 8,000 tons of pipe for the New York water supply department mentioned last week have been awarded in four sections, two sections requiring 2,530 and 2,590 tons each; one lot of 2,160 tons; and the fourth, 1,045 tons:

The following are prices at tide-water:

Northern No. 1 Foundry	$18.75 to 19.50
No. 2 Foundry	18.00 to 18.75
No. 2 Plain	17.50 to 18.00
No. 1 Southern Foundry	18.75
No. 2 Southern Foundry	18.25
No. 3 Southern Foundry	17.25 to 18.00
No. 4 Foundry	17.00 to 17.25

Pig Iron Certificates.—There was little trading in certificates and warrants during the week, due chiefly to the very general holiday dullness. Sales were few, with no important changes in prices. Foundry iron warrants follow:

	Bid.	Asked.
December	16.80	17.25
January	16.80	17.30
February	16.90	17.30
March	16.70	17.30
April	16.80	17.30

Finished Iron and Steel.—The market for finished material developed no new features during the week. A fair

proportion of the business pending a week ago has been closed, and a corresponding number of inquires received. The New York Central railroad has issued its specification for the rail requirements of its various divisions contracts for which were placed some time ago. In the structural field the contract for 4,000 tons of steel bridge material for the New York, Westchester & Boston railroad in the Bronx, has been placed. Work is to begin at once, and the bridges of which there are a number are to be completed by next June. Few new orders for rails have come to light. Several trolley roads and manufacturers of frogs and switches have increased their former orders by some thousands of tons. There have been a few additional importations of structural shapes, the total, however, being only a few hundred tons. Plates and bars have enjoyed only a moderate activity, which was to have been expected during this week. Everything is in readiness for a renewal of buying early in the new year.

The following are prices at tidewater: Angles, 3 to 6 inches x ¼ inch and heavier, 1.84c; beams, 3 to 15 inches 1.84½c; tees, 3 x ¼ inch and heavier, 1.89½c; plates, carloads, tank 1.74½c; flange, 1.84½c; marine and ordinary fire box, 1.94½c; refined iron bars, 1.84½c; soft steel bars, 1.64½c to 1.79c; sheets in carload lots New York, black 2.40c.

Old iron rails	$16.50 to 18.00
Old steel rails, long lengths	22.00 to 23.00
Old steel rails, short pieces	16.50 to 17.00
Relaying rails	24.50 to 25.00
Old car wheels	17.00 to 17.50
Old iron car axles	24.00 to 25.00
Old steel car axles	19.00 to 19.50
Heavy melting steel scrap	15.50 to 16.00
No. 1 railroad wrought scrap	20.00 to 21.00
Iron track scrap	18.50 to 19.50
Wrought pipe	14.00 to 15.00
Cast borings	10.00 to 10.25
Wrought turnings	14.50 to 15.50

CHICAGO.

Year Opens With Market Exceptionally Strong—Sales for December Make Large Total.

Office of *The Iron Trade Review*,
1164 Monadnock Block, January 2.

Specifications and inquiries on the first day of January were heavier than on any day in December. Never before has a year opened with the iron and steel market so strong as it is today. Excepting possibly in scrap iron, and the softness of this is due entirely to weather conditions, there is not a weak spot anywhere. Consumption has kept apace with production right through the holiday season; in fact, so heavy is the volume of specification and so far behind in deliveries are most producers that nearly every plant in this district worked Christmas and New Year's days. Sales during December kept up remarkably well, especially for the heavier lines of finished material; the orders booked in this month in round figures amounting to nearly 200,000 tons of rails, 100,000 tons of plates, 75,000 tons of structural steel, and about 50,000 tons of steel bars. There was also a fair tonnage placed in iron bars and sheets. Galvanized sheets are stronger than they were a couple of weeks ago, the minimum quotation for No. 28 gauge being 3.51½c Chicago. Box annealed sheets can still be bought on the basis of 2.41½c Chicago for No. 28 gauge. Iron bars are strong in this market at 1.85c, with prospects of an advance as soon as scrap hardens. Pig iron is without change in price. The market is very strong, and will require little encouragement to force an advance. Forging billets are extremely scarce, the minimum quotation in this city being $35. Wire rods are also difficult to obtain, and are strong at $36 Chicago. The structural mill at South Chicago continues to run on Carnegie contracts, though some local business has lately been booked for rolling there.

Pig Iron.—Earlier than usual, the market has taken on signs of activity. No buying of consequence has so far been transacted, but there is an air of expectancy all over the market. Inquiry for iron is free, and not a few melters are asking prices on deliveries extending right through the year. Some sales on this basis are reported from Cincinnati and Birmingham, but thus far Western melters have contented themselves with merely sending out their usual number of "sounders." The buying movement, however, is felt to be near at hand as a great many foundrymen in this district have covered only for their first quarter's requirements. Many have melted heavier than originally planned, and these will have to come into the market soon for supplementary tonnages. Altogether, despite the heavy buying of last year, the early wants of 1906 are expected to be very heavy. Prices are without change, though extremely strong. An advance to the $15 Birminhgam basis is expected in southern grades with the first onward movement. Several of the leading interests are already asking this price; those that are not are only waiting for a fair amount of buying before making the change. We quote as follows:

Lake Superior charcoal	$20.00 to 20.50
Northern Foundry No. 1	19.75 to 20.00
Northern Foundry No. 2	19.25 to 19.50
Northern Foundry No. 3	18.75 to 19.00
Northern Scotch Foundry	20.00 to 20.50
Ohio Strong Softeners No. 1	20.30 to 20.80
Ohio Strong Softeners No. 2	19.80 to 20.30
Southern Foundry No. 1	18.65 to 19.15
Southern Foundry No. 2	18.15 to 18.65
Southern Foundry No. 3	17.65 to 18.15
Southern Foundry No. 4	17.40 to 17.90
Southern No. 1 Soft	18.65 to 19.15
Southern No. 2 Soft	18.15 to 18.65
Southern Gray Forge	16.65 to 17.15
Southern Mottled	16.40 to 16.65
Southern Silveries (4 percent to 6 percent Silicon)	19.15 to 19.65
Jackson Co. Silveries (8 percent to 10 percent Silicon)	24.30
Alabama and Georgia Car Wheel	23.15 to 23.65
Malleable Bessemer	19.50 to 20.00
Basic Iron	18.90 to 19.15

Billets.—Forging billets continue in active demand. The one local mill having any for sale still asks $35 Chicago for same. Wire rods are scarce and firm at $33 Pittsburg; chain rods, $35.

Bars.—The buying of iron and steel bars is without diminution. Last month the sales were especially heavy, and mills open the new year with congested order books and an overwhelming volume of specifications. Prices are extremely strong and varying premiums are paid for early shipments of steel.

We quote carload lots, mill shipments, Chicago delivery, as follows: Bar iron, 1.85c to 2c; soft steel bars and bands, 1.66½c, half extras; soft steel angles less than 3 x 3, 1.76½c; hoops 2.01½c; base, full extras; hard steel angles, 1.70c to 1.80c. Jobbers' prices are very firm as follows: Bar iron, 2c to 2.10c full extras; soft steel rounds and squares, 2 inches and larger, $2 per 100 pounds base; flats, 2 inches and 4 inches by 1⅛ inch and thicker, $2 per 100 pounds base; flats, 4½ inches x 5 inches and 6 inches x 5-16 inch and thicker, $2 per 100 pounds base; all ovals, half ovals and half rounds, $2 per 100 pounds base; steel bands, 1.95c to 2c half extras; soft steel hoops, 2.30c to 2.40c full extras. Other sizes not mentioned above, $1.85 per 100 pounds base, plus half extras.

Sheets.—Galvanized sheets are stronger than they have been since the new prices went into effect. The minimum quotation at which they can now be bought in this city is 3.51½c for No. 28 gauge. There is a good demand for black sheets, especially for the heavier sizes.

Blue annealed, Nos. 3, 9, 10, 1.86½c; Nos. 11-12, 1.91½c; Nos. 13-14, 1.96½c; Nos. 15-16, 2.06½c. Box annealed, Nos. 18-20, 2.16½ to 22½c; Nos. 22 and 24, 2.21½c to 2.26½c; Nos. 25 and 26, 2.26½c to 2.31½c; No. 27, 2.31½c

to 2.36½c; No. 28, 2.41⅛c to 2.46½c; No. 29, 2.55½c to 2.61½c. Jobbers report a good business and that store prices are firm. We quote as follows: No. 10, 2c to 2.10c; No. 12, 2.05c to 2.15c; No. 14, 2.10c to 2.20c; No. 16, 2.20c to 2.30c; Nos. 18 and 20, 2.40c to 2.50c; Nos. 22 and 24, 2.45c to 2.55c; No. 26, 2.50c to 2.60c; No. 27, 2.55c to 2.65c; No. 28, 2.65c to 2.70c; No. 30, 3.15c to 3.35c.

Quotations on galvanized sheets, mill shipments, carload lots, Chicago delivery, are as follows: Nos. 10 and 11, 2.36½ to 2.41½c; Nos. 12 and 14, 2.46½c to 2.51½c; Nos. 15 and 16, 2.56½c to 2.61½c; Nos. 17 and 21, 2.71½c to 2.76½c; Nos. 22 and 24, 2.86½c to 2.91½c; No. 26, 3.06½c to 3.11½c; No. 27, 3.26½c to 3.31½c; No. 28, 3.46½c to 3.51½c. From store, galvanized sheets are quoted as follows: Nos. 10, 12 and 14, 3c to 3.10c; Nos. 16, 18 and 20, 2.90c to 3c; Nos. 22 and 24, 3.05c to 3.15c; No. 26, 3.25c to 3.35c; No. 27, 3.45c to 3.55c; No. 28, 3.65c to 3.75c.

Plates.—New tonnage is coming in briskly. Specifications are also heavier than formerly, and the local mill is rapidly filling up with orders for delivery ahead. The new tonnage taken last month is especially significant of the conditions that may be expected during 1906. December is invariably a dull month, but the orders for plates taken in that month amounted to nearly 100,000 tons.

We quote carload lots, mill shipments, Chicago delivery, as follows: Tank steel, ¼-inch and heavier, up to 100 inches wide, 1.76½c base; flange steel, 1.86½c base; marine steel, 1.96½c base; all full extras. Plates, 3-16 inch thick $2 extra; gauges, 7 to 8, $3 extra; No. 9, $5 extra. Less than carload lots, $5 extra. Local jobbers report a stiff demand from stock prices are very firm. We quote tank steel, ¼-inch and prices are very firm. We quote tank steel, ¼-inch and heavier, up to 72 inches wide, 2c to 2.10c; 72 inches to 96 inches wide, 2.10c to 2.20c; 3-16 inch up to and including 60 inches wide, 2.10c to 2.20c; 3-16 inch to 72 inches wide, 2.35c to 2.45c; No. 8, up to 60 inches wide, 2.25c; flange steel, 25c extra; heads, 25c extra.

Structural Steel.—No cessation is noted in the volume of new business, despite the fact that the holiday season is barely over. All through December, contracting was steady, consumers taking whatever deliveries mills will give. At the present time, it is not expected that any new tonnage can be shipped before July, and for light beams and channels not before October. Prices are very strong, and varying premiums are paid for quick shipments.

We quote mill shipments, f. o. b. Chicago, as follows: Beams and channels, 3 to 15 inches, inclusive, 1.86½c; angles, 3 to 6 inches, 1.86½c; angles, larger than 6 inches, on one or both legs, 1.96½c; beams, larger than 15 inches, 1.96½c; zees, 3 inches and over, 1.86½c; tees, 3 inches and over, 1.91½c, with the usual extras for cutting to exact lengths, punching, coping, bending, or other shop work. Quotations on lots from store are as follows: all angles, 3 inches and larger, $2.25 per pound base; tees, 3 inches and larger, $2.30 per 100 pounds base; 3, 5, 9, 12 and 15 inch beams, $2.25 per 100 pounds base; 4, 8 and 10 inch beams, $2.50 per 100 pounds base; 6, 7, 18, 20 and 24 inch beams, $2.75 per 100 pounds base; 3, 4, 9, 12 and 15-inch channels, $2.25 per 100 pounds base; 6, 7, 8, and 10 inch chanels, $2.50 per 100 pounds base; 5 inch channels, $2.75 per 100 pounds base.

Cast Iron Pipe.—Specifications are coming in freely, and all pipe foundries are reported very busy. In some districts, where the weather permits, pipe-laying is active, and shipments to these sections are heavy. Prices are without change. We quote carload lots, f. o. b. Chicago: 4-inch water pipe, $31; 6, 8, 10 and 12-inch, $30; larger sizes, $29.50; gas pipe, $1 extra.

Merchant Pipe.—The new year has opened with a remarkably active market. Jobbers have generally completed their inventory and are now busy replenishing their stocks. Specifications for the spring trade are unusually heavy owing to the greatly depleted warehouses as a result of mild weather which has prevailed to the present date. Prices are firm and without change. We quote carload lots, f. o. b. Chicago: ¾-inch to 6-inch black steel pipe, 78.35 per cent discount from list. From stock, jobbers' discounts 76½ to 77 per cent.

Boiler Tubes.—There is a good demand for tubes. Mills are slow in catching up on deliveries, a heavy tonnage of specifications having been carried over from 1905. Prices are firm and without change. We quote carload lots, Chicago delivery, as follows:

	Steel.	Iron.	Seamless.
1 to 1½ inches	40.35	37.35	53.00
1¾ to 2¼ inches	54.35	39.35	40.00
2½ inches	56.35	44.35	43.00
2¾ to 5 inches	62.35	51.35	
Up to 4¾ inches			50.50
6 to 13 inches	52.35	37.35	

Less than carload lots from store, as follows:

	Steel.	Iron.	Seamless Steel.
1 to 1½ inches, inclusive	40	35	42½
1¾ to 2¼ inches, inclusive	50	35	35
2½ inches, inclusive	52½	35	30
2¾ to 5 inches, inclusive	60	47½	42½

Coke.—Contracting for coke is light. Every day there is more or less demurrage fuel offered for sale, which is an effective bar to the establishment of any market. Connellsville coke on contract is quoted at $3.75 ovens, but for spot delivery it can be bought at prices ranging from $3 upwards, according to the eagerness of the seller to dispose of his consignment. Solvay by-product coke is quoted at $6.40 Chicago.

Old Material.—There is little news to report regarding the scrap market. Trading is quiet and prices are soft, a condition which may be expected to continue as long as the present mild weather lasts. The Chicago & Northwestern has a list in the market of about 1,000 tons,—the only railroad offering out this week. We quote gross tons, as follows:

Old Steel Rails (4 feet and over)	$17.25 to 17.75
Old Steel Rails (less than 4 feet)	16.00 to 16.50
Old Car Wheels	19.00 to 19.50
Old Iron Rails	23.00 to 23.50
Relaying Rails, subject to inspection	26.50 to 27.00
Heavy Melting Steel	15.00 to 15.50
Mixed Country Steel	12.50 to 13.00
No 1 R. R Wrought	$17.75 to 18.25
No 2 R. R. Wrought	17.25 to 17.75
Shafting	18.00 to 18.50
Dealers' Forge No. 1	14.00 to 14.50
Wrought Pipe and Flues	12.50 to 13.00
No. 1 Cast, 150 lbs. and less	14.50 to 15.00
No. 1 Mill	9.50 to 10.00
No. 1 Busheling	12.75 to 13.25
No. 2 Busheling	12.25 to 12.75
Country Sheet	8.50 to 9.00
No. 1 Boilers Cut	12.50 to 13.00
Boiler Punchings	15.00 to 15.50
Iron Car Axles	24.00 to 24.50
Steel Car Axles	20.00 to 21.00
Iron Axle Turnings	12.25 to 12.75
Cast Borings	10.00 to 10.50
Mixed Borings, etc	10.00 to 10.50
Machine Shop Turnings	11.75 to 12.25
Railroad Malleable	15.00 to 15.50
Agricultural Malleable	14.00 to 14.50
Stove Plate and Light Cast Scrap	12.00 to 12.50
Old Iron Splice Bars	20.00 to 20.50

STEEL FOUNDRY COMPANY'S PLANT.

The Schlieper Engineering & Contracting Co., Pittsburg, has been awarded the contract for a new steel casting plant for the Steel Foundry Co., of Cincinnati. A main building 135 x 260 feet and a power house 30 x 120 feet will be erected. The equipment will include one 10-ton open-hearth furnace, with drying, annealing and core ovens, besides a converter of the Tropenas or Raofke type for use in making small castings of high grade steel. Oil will be used for fuel and Tate-Jones burners will be installed for this purpose. Work on the new building will be commenced this week and it is expected that the first casting will be made about May 1.

UNION DISREGARDS CONTRACT

And Repudiates National Official's Order—Pressmen Join Striking Printers.

The striking union printers of Cleveland, despairing of winning their fight without the assistance of allied trades, have prevailed upon the union pressmen and press-feeders of the city to join their forces, almost every plant in the city being more or less affected by this latest development in the strike situation. In deciding to go out on a sympathetic strike, the pressmen and press-feeders flatly disregarded the orders of their national officials and just as squarely broke a contract with the employing printers of the city by which they had agreed to work under existing conditions until May, 1907. Their action in going out was ostensibly based on a demand for the eight-hour day, though they had bound themselves explicitly to a nine-hour day until May of next year. National officials of the pressmen's union were called to Cleveland, but local officers of the union persistently refused to confer with them, only one or two at a time,—never enough for a working quorum,—meeting with the nationals. National President Higgins of the I. P. P. & A. U. ruled that the Cleveland strike of pressmen and feeders was unauthorized and illegal; accordingly he declared that union men refusing to obey the order to strike would be protected by the national organization and that non-union men employed to replace union strikers would not be subject to condemnation, no effort being made to prevent them from working. In spite of this action, however, a general strike was declared in an attempt to help the striking printers who are meeting with only discouragement after an idleness of more than two months. The net result of the fight so far has been the decision of a number of employing printers in Cleveland and elsewhere, to operate their plants hereafter as "open shops."

Sluggers Convicted.

The extent to which certain labor unions have gone in recent attempts to prevent the employment of non-union men to replace strikers was forcibly demonstrated in Chicago last week when two hired sluggers and five officers of the Carriage and Wagon Workers' Union were found guilty by a common pleas jury after a hard fought trial on charges of conspiracy. Unless new trials are granted, they will be sent to the penitentiary. Those found guilty were Charles Gilhooley, leader of a gang of sluggers, one of the men in his employ, and the secretary, financial secretary and recording secretary of the union as well as two members of the executive board. The case on which the conviction was secured was typical of many recent occurrences in Chicago. A non-union carriage worker, while on his way home from a factory where a strike was in progress, was attacked by two men and severely injured. He died two weeks later from pneumonia,contracted from exposure while lying unconscious on the ground. George Miller, a former president of the union, some time ago turned state's evidence and declared that the union maintained what he called a "wrecking crew," citing the dead man's case as an instance of its work. Nearly 2,000 veniremen were examined to secure a jury for the trial, which has cost Cook county about $35,000.

"A Daily Reminder of Important Matters," is the title of a neatly bound little book being circulated by Warren Webster & Co., Camden, N. J. It includes useful information, pages for daily notations and other features.

LAKE ERIE ORE RECEIPTS

Exceed the Previous Record Year by More than Six Million tons—Ore on Docks.

The receipts of iron ore on Lake Erie docks in 1905 were 29,018,282, tons according to the statistics just compiled by the *Marine Review*. This great tonnage exceeds by 6,368,858 tons the previous high record, that of 1902. In 1903, Cleveland led in ore receipts, with Ashtabula a close second and Conneaut third. In 1904, Conneaut exceeded Cleveland by 649,643 tons and Ashtabula by 444,405. Conneaut led with Ashtabula second and Cleveland third In 1905, Ashtabula led with Cleveland second and Conneaut third.

The following table gives receipts at Lake Erie ports, and ore on docks for the years named:

IRON ORE RECEIPTS AT LAKE ERIE PORTS, GROSS TONS

Ports	1905	1904	1903	1902	1901
Toledo	1,006,855	508,703	652,305	1,037,571	708,298
Sandusky	51,202	48,356	130,532	165,556	33,017
Huron	825,278	231,364	486,106	520,646	431,311
Lorain	1,605,823	972,931	990,490	1,442,417	721,602
Cleveland	5,854,745	3,572,228	4,434,160	4,873,318	3,831,060
Fairport	2,008,621	1,157,858	1,434,342	1,538,744	1,181,776
Ashtabula	6,963,005	3,639,250	4,242,160	4,796,805	3,981,170
Conneaut	5,327,552	4,083,655	3,903,937	4,300,301	3,181,019
Erie	2,112,476	1,284,778	1,257,798	1,717,268	1,379,377
Buffalo } Tonawanda }	3,312,725	2,433,601	2,149,901	2,256,798	1,475,386
Total	29,018,282	17,932,814	19,681,731	22,649,424	17,014,076

IRON ORE ON LAKE ERIE DOCKS, DEC. 1, GROSS TONS

Ports	1905	1904	1903	1902	1901
Toledo	368,024	318,573	105,710	310,023	254,196
Sandusky	52,977	75,134	95,275	95,175	47,384
Huron	208,023	182,495	253,249	232,764	231,501
Lorain	271,695	299,504	288,581	328,304	195,803
Cleveland	1,330,619	1,237,033	1,337,750	1,500,604	1,378,060
Fairport	759,961	630,420	845,946	924,236	710,590
Ashtabula	1,909,495	1,403,575	1,911,911	1,967,136	1,769,145
Conneaut	976,976	684,487	591,364	673,679	604,106
Erie	564,961	583,439	657,409	722,906	470,718
Buffalo	315,780	318,739	282,890	319,367	198,100
Total	6,758,511	5,763,399	6,371,085	7,074,254	5,859,663

Our statistics last May showed 2,271,631 tons on Lake Erie docks at this time. Adding to this the receipts of the season just closed and subtracting the amount on dock Dec. 1, we have 24,531,402 tons as the shipments to furnaces during the season of navigation, including ore unloaded directly upon furnace docks as against 16,658,806 tons in the corresponding period of 1904, an increase of 7,872,596 tons, and against 16,903,013 tons in 1903. The percentage of receipts to direct shipments was not, however, as high last year, being 93 in 1904, 86 in 1903, and 84.5 in 1905.

The shipments of iron ore by water from the Lake Superior region for 1905 were 33,473,788 tons. The following table shows the shipments for five years:

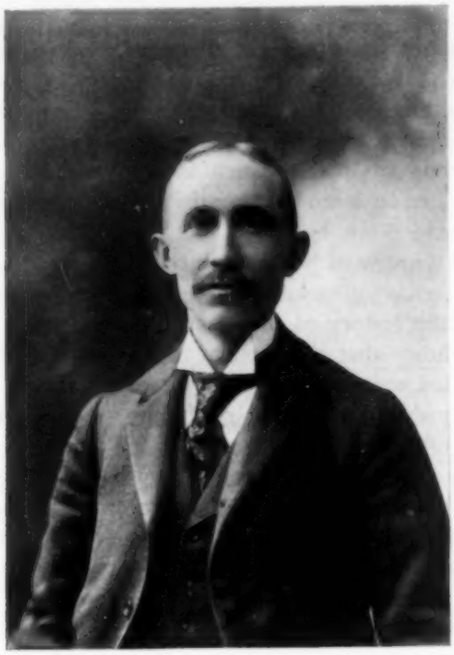
	1905	1904	1903	1902	1901
Escanaba	5,307,938	3,644,267	4,277,561	5,413,704	4,022,668
Marquette	.....	1,907,301	2,007,346	2,595,010	2,354,284
Ashland	2,977,828	2,288,400	2,823,119	3,553,919	2,886,252
Two Harbors	3,485,344	4,566,542	5,120,656	5,605,185	5,018,197
Gladstone	5,118,385	553	35,816	92,375	117,089
Superior	.....	4,169,990	3,978,579	4,180,503	2,321,077
Duluth	8,804,443	4,649,611	5,356,473	5,508,408	3,437,955
Total, by lake	7,779,850	21,226,664	23,649,550	27,039,169	20,157,522
Total, all rail	.....	596,175	640,328	531,952	436,015
Total shipments	33,473,788	21,822,839	24,289,878	27,571,121	20,593,537

The table does not include shipments to Lake Erie ports from the Lake Superior Corporation's Helen mine in Canada on the Michipicoten range, nor does it include shipments for 1905.

RESIGNATION OF GEORGE A. BAIRD.

Chicago, Jan. 2.—George A. Baird, vice president and general sales agent of the Republic Iron and Steel Co., has resigned.

Mr. Baird was one of the few remaining links connecting the present regime at the head of this corporation with the "old guard" of men that organized and developed the company to its present highly efficient state; and his retirement is greatly regretted by everyone in and out of the company. It is a step, however, which he has contemplated taking for some months. His duties as an executor of the estate of P. L. Kimberly require his time and attention to a greater degree than at first expected; and to properly perform this trust, Mr. Baird has reluctantly given up a connection and profession to both of which



GEORGE A. BAIRD.

he was greatly attached. When the company was reorganized in October last, it was hoped that Mr. Baird's valuable services and experience could be retained by relieving him of the details connected with the work of the sales department and allowing him more time to devote to the duty willed him by his dead friend; but with the decision to move the executive and sales offices of the company to Pittsburg, Mr. Baird felt that he could no longer consistently act in both capacities, and on Friday, Dec. 29, handed in his resignation. His successor has not yet been appointed, and Mr. Baird will continue in his official capacity until one is named.

Mr. Baird has been engaged in the iron and steel manufacturing business all his working life. His first connection was as office boy in the employ of P. L. Kimberly & Co., at Saron, Pa. In October, 1894 he was made assistant secretary and treasurer of the Atlantic Iron & Steel Co., at Sharon, Pa. Four years later, or in July, 1898, he became manager of the Sharon Iron Co., Ltd., and of the Buhl Steel Co., both of Sharon, Pa. When these interests were merged into the Republic Iron and Steel Co., in the spring of 1899, Mr. Baird accepted the position of general sales agent of the company, being elected a director and vice president in October, 1903. His executive ability and foresight as a salesman have contributed much to the success and growth of this company, which started business six years ago with an aggregation of antiquated plants, but which today occupies a commanding position in the iron and steel world.

Mr. L. C. Hanna, of Cleveland, one of the members of the executive committee of the Republic Iron & Steel Co., spoke Wednesday in terms of highest praise of Mr. Baird, saying that under him the sales department had been most ably conducted.

STRIPPING AT MESABI MINES.

Work Proceeds Rapidly, As Ground is Not Deep-Frozen—Preparing For Heavy Season.

(Special Correspondence.)

Duluth, Minn., Jan. 1.—The Lackawanna Steel Co. and Pickands, Mather & Co. will have 19 shipping mines in the Lake Superior region the coming year. This is far in excess of any number they have ever had, and their total business will be correspondingly increased. Most of these mines, however, will be comparatively small shippers this season.

The Buffalo & Susquehanna Co. will have a greater number of active mines than ever, and will be carrying forward a larger amount of exploration work than it has ever done. Its Susquehanna mine at Hibbing is preparing for a very lively season, and is sinking another shaft and developing underground on a large scale. It has never shipped any ore, but has a large tonnage shown up. It has other properties on the Mesabi and is exploring now actively on the Menominee range where it has taken a forty-acre tract close to the Armenia, which looks very promising.

Stripping at open pit Mesabi mines continues steadily, and will be maintained all winter if possible. It is an astonishing fact, but there is less than a foot of frost in the ground where it has been undisturbed, and in many cases there is not six inches. The winter is a far better time for stripping than summer, if the frost is not more than a foot or two deep, for there is no mud and the working conditions are excellent. These concerns are now engaged in stripping on the Mesabi range, all with steam shovels and all on a large scale. The Oliver Iron Mining Co. and Jos. Sellwood, as representing mining companies; the Drake & Stratton Co., which has work at no less than four mines; Winston Bros., at two mines; McArthur Bros., at one; Porter Bros., at one; Roberts-Kingston Co., now stripping at one and to begin at a second in a few days; they will probably move not less than 8,000,000 yards during the year, if the winter proves propitious.

The Great Northern Power Co., of Duluth, is now employing six steam shovels in its canal excavation, and hopes to have the work done early in the spring, so that the water can be turned through its pipes and on the wheels about July next. This contract was in the hands of Porter Bros., but they did very little and the company took the work over in the autumn, placing five additional shovels in the canal bed. The plan of using current from these works for the operation of mines and iron ore railroads is moving along and some decisions may be looked for soon.

The importance of modern methods and machinery in manufacturing has been demonstrated by a well known New York concern. By installing the latest and most modern machines, adopting high speed steel tools, and a good cost keeping system, this company reduced its shop force from over 100 men to less than 50. At the same time it almost doubled its output.

THE IRON TRADE REVIEW

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GOOD AUGURIES FOR 1906

The dawning of a new year naturally prompts an inquiry as to what it may have in store. The same cheerful optimism which inspires New Year resolutions generally leads such inquiries to a very favorable conclusion, and the results do not always justify the anticipations, just as New Year resolutions are not invariably kept. The inquiry may savor less of the season's optimism if it take the form of setting up all the men of straw which can be created and then endeavoring to knock them down.

Pig iron production has been at an almost incredible rate, and one which it is hard to believe can be maintained. It should be noted, therefore, that while the year 1905 has made probably within 50,000 tons either way of 23,000,000 tons of pig iron, the year opened with production at the rate of scarcely 20,000,000 tons annually, and closed with a rate of 25,000,000 tons. Far from production showing any declining tendency, it is still on the increase. There are no prospects of any furnaces being blown out except for necessary repairs, and those who are now erecting blast furnaces with a rated capacity of 1,830,000 tons, fully expect that they will be blown in promptly upon completion and that their product will be needed. About half the tonnage capacity is expected to be completed between now and June 1, and the other half during the remaining seven months of the year. The chief danger in the pig iron market for a couple of months has been a scarcity, with a consequent runaway in prices. The mild weather of the latter part of the year has largely averted this danger.

The actual increase in output of finished products, castings, forgings and rolled material, has not been as great as the pig iron figures would indicate, as a much smaller percentage of old material has been used than in former years, the outcome of old material not keeping pace with the production of pig iron. The large increase which actually has occurred in finished material output has been accomplished almost wholly without the installation of new capacity, so far as standard steel works are concerned. For more than a year scarcely any important additions have been made to Bessemer or open-hearth steel capacity. The large increase in actual production has been due to the breaking of records at existing plants. No unwieldy additions to capacity have been put upon the trade.

Previous years of great prosperity, and particularly 1899 and 1902, brought great advances in prices of all iron and steel products, which could be maintained only while pressure for delivery was extreme. The year 1905 has laid no such foundation for a slump. Prices are on a moderate basis, having in many cases been held down by force.

The tonnage of business on the order books of steel producers is universally acknowledged to be the largest in the history of the trade. In past times it has been shown that such tonnages are not always to be depended upon, because of direct cancellations, failure to furnish specifications, or failure to take material when offered. The present tonnage has been specified to a large extent already; very important reforms have been effected whereby contracts are made binding, the buyers' requirements being scaled down and only such tonnages sold them as it was absolutely certain they would be able to use and pay for. Never was the tonnage on books of a more substantial nature.

Present prices of iron and steel may look high as compared with the low records made years ago in times of universal depression. The general level of all values has greatly advanced since then; gold production has been very heavy and the actual purchasing power of a dollar has been much reduced. The adverse influence of this fact to the steel maker has been made up very largely by increased economy of manufacture. Measured in dollars and cents the cost of production has somewhat increased, but measured in terms of brain and muscle force expended it has greatly decreased.

The appearance of a lull, through a mild form of which the trade is now passing, is generally the signal for doubt and apprehension in one quarter or another. These are practically absent now. The market in 1905 was well protected by a lull at the beginning of the year and by another as midsummer approached, after fears had been entertained, in the spring, that too rapid a pace was being set.

Though the problem be approached in the most conservative spirit, it is impossible to find any year

in the past which the American iron trade has entered under more favorable auspices than are now shown. May the good auguries all be verified.

ACHIEVEMENTS OF THE PAST YEAR.

The chapter of history made by the year 1905 constitutes a distinctly new achievement for the American iron trade. All tonnage records have been badly broken, and yet prices have been both profitable and steady. The trade has frequently broken production records: in the past quarter century there were 16 years which broke all records for pig iron production and only nine which did not; there have frequently been years in which prices were very profitable, but far from steady, and there have been other years in which prices were steady but not profitable; the combination of a large increase in production, profitable prices and steady prices throughout a year is one never attained until the year 1905 took its place in American iron and steel history.

It is a strange year in the American iron trade which does not present at least one special feature that clearly distinguishes it from all other years. Let it be set down that the year 1905, not through the fortuitous grouping of unrelated circumstances, but through the firm and energetic action of men in the trade, accomplished reforms in the manner of naming prices and methods of making sales which have redounded to steadiness and will render a distinct and valuable service to the iron and steel market in future years.

The jug-handled blanket contract, amounting to little more than an option in favor of the buyer of finished steel products, has not disappeared from the trade, but it is vastly less prevalent than it was, and from some lines wherein it formerly held almost undisputed sway it has been well nigh totally eliminated.

Those who have been responsible for this reform need entertain little hope of plaudits from buyers or of liberal orders in the future when appearances of weakness present themselves; their reward must come in the more substantial way that the reform will tend to forestall, and will in any event certainly defer, the advent of less favorable conditions, whereby the period of reasonable prosperity will be prolonged, and by the extent of its prolongation, and the profits during that period, their reward will be measured and paid.

THE RECORD IN PRODUCTION.

The achievement referred to in what has just been said may not strike the casual observer as the most remarkable feature of the American iron trade in 1905. Certainly the production record is more spectacular. Following two years, 1902 and 1903, in each of which pig iron production was about 18,000,000 tons, or more than 2,000,000 tons beyond any previous record, there was an off year with a production of about 16,500,000 tons, and then comes 1905 with a production of 23,000,000 tons, a gain of 5,000,000 tons or 28 per cent over the best previous record, and of 6,500,000 tons, or almost 40 per cent, over the previous year.

It is comparatively nothing that production of pig iron in 1905 broke all previous records by a number of tons greater than any previous increase; the trade has grown and naturally deals in larger figures. It is something distinctly worthy of emphasis that not for a quarter of a century has the percentage of increase over the best previous year been as great as the 28 per cent shown by the year 1905. To put it in other words: dealing with the miserable figures of an increase in pig iron production from 2,741,853 tons in 1879 to 3,835,191 tons in 1880, the year 1880 broke all previous records by 40 per cent; in not a year since then has pig iron production broken the best previous record by as much as 25 per cent, until 1905 breaks all previous records by 28 per cent, to do which it must make an advance of 5,000,000 tons, an amount greater than the total production in any year up to 1886.

The production of pig iron is, in the main, to be taken as an index to the production of merchantable finished material, including iron and steel castings, forgings and rolled iron and steel. It is not an absolutely accurate guide, for the reason that in former years a larger proportion of old material was used by foundries, by iron mills and by basic open-hearth steel works than has been used in the past year. A few years ago the most serious fears were entertained that a halt would be called in the rapid growth of the basic open-hearth industry through the failure of the scrap supply. Through the three media, the cupola, the basic open-hearth furnace and the boiling, scrapping or busheling furnace, there has passed in 1905 a greatly decreased percentage of old material, its place being taken by pig iron. The founder, more used to analysis of his raw materials, is well satisfied to use pig iron more exclusively; the producer of wrought iron likewise uses more pig iron, and the basic open-hearth steel works either uses less scrap, or replaces old material by new scrap made by liberal cropping in the rolling mill, whereby the quality of the product is improved and scrap is found in a comparatively inexpensive way.

To a degree, then, the increase in production of finished iron and steel has not been as great as the increase in pig iron production, but the proportion is not greatly less. The analysis may encourage those who have looked askance at the record of pig iron and wondered if the pace could be maintained. To those who feared for the future progress of the open-hearth steel industry there is the greatest encouragement.

The different lines of finished product have not advanced in equal measure. Rails have not touched their best previous record, wire products have done

well, plates, shapes and merchant mill products have done very well, and sheets and tin plates have made a stupendous advance. The American Sheet & Tin Plate Co. itself has produced 1,100,000 gross tons of sheets and tin plates, an advance of not less than 44 per cent over its best previous record.

MARKET HISTORY.

The movement of the iron and steel market from month to month has been far from as interesting as it has been in some previous years. The course of prices has been over a comparatively narrow range and is well shown by tables elsewhere in this issue while special events are recorded in sufficient detail in the chronology.

The year opened with a large tonnage on order books, the great bulk of which had been entered during the previous fall, when prices were at the minimum of recent times. There had been advances late in the old year, and early in the new year there were further advances. Gradually the old business was worked off and in most lines it was easy to book additional business at the full advance. In a few lines, including merchant pipe, wire products, sheets and tin plates, this was not possible, and recessions from maximum prices were necessary. Later in the year these lines became stronger, but while every line closed the year with a firm market the lines which have been mentioned are distinctly at a lower level, compared with the heavy lines, rails, shapes and plates, than used to prevail. It is probably not a fortuitous circumstance. These lines have become large tonnage producers, and with larger tonnages lower prices naturally come.

Buying has not been irregular, but has come in great waves. In pig iron there were great spurts, in both the north and the south, whereby a tonnage running into six figures would frequently be compressed within the limits of a single week.

In crude steel there were two distinct buying waves, following the heavy movement in progress at the opening of the year. In December and January, sales of a trifle over 150 000 tons of billets and sheet bars were reported. February and March were comparatively light, except for the heavy sales made the middle of March to the Pittsburg Steel Co. As these were not carried out, but supplanted by a more important contract later, they need not be considered. Without them, the open market tonnage reported in crude steel for February and March was but 93,000 tons, whereupon came April with a reported tonnage of 86,000 tons of billets and sheet bars. A number of the contracts ran through the third quarter and some covered the fourth quarter. Then there was a lull, the market being relatively weak. In July outside sellers gradually disappeared and the market fell into the hands of the Carnegie Steel Co. for all the territory naturally tributary to it, whereupon, late in July and through the month of August it made heavy contracts with nearly all the outside finishing mills depending upon purchases of crude steel. The company has three styles of contract, one subject to monthly adjustment of price and not binding the consumer, but simply guaranteeing to supply him with steel if requested in good time, another subject to quarterly price adjustment, and other special forms for long periods. Early in September the Carnegie Steel Co. withdrew as an open market seller of steel, and the supply since then has been precarious, but consumers generally had well covered themselves.

Rails furnished a very interesting feature. The early buying had been very light. In the early spring the rail mills, anticipating the extremely favorable conditions which would prevail later in the year, repeatedly urged the railroads to buy liberally, but they refrained, partly because they still cherished hopes that the $28.00 price, which had first been fixed in the spring of 1901, and which in 1904 had been held by main strength alone, would ultimately yield to a lower price, and partly because they had not the courage to lay liberal plans for betterments. In June the railroads suddenly came into the market for additional tonnages, when it was too late to make the deliveries desired. All the additional tonnage which could be handled was quickly placed. Until June there had been no intention of putting the Ohio works at Youngstown on rails, but on July 1 the change was made and the plant has rolled rails since then, with a small tonnage of billets and no sheet bars. The belated demand for rails had much to do with the scarcity of billets and sheet bars which developed late in the year.

DEATH OF WILLIAM J. LEWIS.

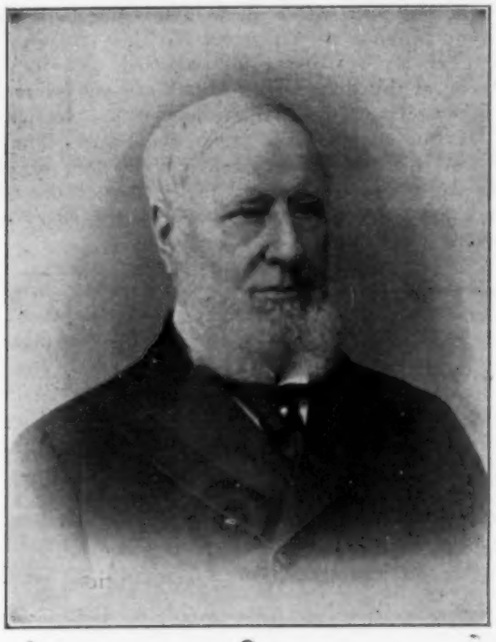
William J. Lewis, of the firm of Lewis, Oliver & Phillips, from which sprang the vast Oliver interests controlled by the Oliver Iron & Steel Co., died at his home at Hazelwood near Pittsburg, Jan. 3. Death was the result of a general breakdown brought on by advanced age. His condition took a decided turn for the worse about six weeks ago, and pneumonia, the direct cause of his death, developed last week. Mr. Lewis was born in England in 1822. In his career as a manufacturer he originated and perfected many patent devices and pieces of machinery, and it was his inventive genius which contributed most largely to his success and that of the interests with which he was connected.

CHARLES S. GUTHRIE IMPROVING.

Charles S. Guthrie, chairman of the executive board of the Republic Iron & Steel Co., was operated upon for appendicitis Saturday night at Salisbury, N. C. His condition following the operation was extremely critical and physicians were doubtful as to outcome, but some inprovement was noted early in the week and hope is now being held out for his ultimate recovery. A telegram from Mrs. Guthrie to L. C. Hanna Wednesday stated the condition of Mr. Guthrie was considerably better.

Launching of the Steel Freighter B. F. Jones.

An event of considerable significance to the iron and steel trade occurred at Detroit last Saturday, when the steel freighter B. F. Jones was launched from the Ecorse yard of



B. F. JONES.

the Great Lakes Engineering Works. It was another link in the complete chain which the ore-owning, steel-making companies are now forming. This new freighter was

WILLIS KING AND B. F. JONES JR.

launched for the Jones & Laughlin Steel Co., of Pittsburg, a heavy owner of Lake Superior ores, and occupying a foremost position in the steel-making industry of the United States. This company has for some years owned the steamer Angeline, but the bulk of its tonnage has always been carried in chartered vessels. In common with other steel-making interests, however, it is beginning to build vessels to care for the transportation of its own ore and the B. F. Jones, will shortly be followed by the launch of the Henry B. Laughlin, at the Great Lakes yard.

The B. F. Jones is 550 feet long over all, 530 feet keel, 56 feet beam and 31 feet deep, her engine, triple-expansion, with cylinders 23, 37 and 63 inches diameter by 42-inch stroke, supplied with steam from two Scotch boilers, 15 feet diameter by 11½ feet long, allowed a working pressure of 175 pounds. The hull is of arch construction with straight tank sides and thirty-two hatches,

ADELAIDE DALZELL JONES.

spaced 12 feet centers. The steamer was christened by Miss Adelaide Dalzell Jones, daughter of Mr. B. F. Jones, and granddaughter of the late B. F. Jones in whose honor the steamer is named.

The launching party journeyed from Pittsburg in the special car Magnet, and included Mr. B. F. Jones, Mr. Willis L. King, Mrs. B. F. Jones, Mrs. Willis L. King, Miss Adelaide Dalzell Jones, B. F. Jones III, and Master Gordon King. Others on the launching stand were Mr. C. D. Weatherbee, general superintendent, Bath Iron Works, Bath, Me.; F. A. Goodrich, St. Louis, Mo.; Mr. and Mrs. F. H. Holt, Mrs. Antonio C. Pessano, Miss Elizabeth Pes-

sano, Miss Annie Russel, Mrs. W. P. Hamilton, Mr. R. E. Plumb, Mr. W. S. Kinnear, Congressman Edwin Denby, Walter Russel, Antonio C. Pessano and John R. Russel, all of Detroit. An informal dinner was tendered the launching party at the Detroit club by the officers of the ship building company, the launching party returning to Pittsburg the same evening.

BRITISH BUYERS ARE ACTIVE.

Regard the Delay as Dangerous and Place Orders Wherever They Will be Accepted.

(Special Correspondence.)

Birmingham, Eng., Dec. 26.—It is many years since Christmas found the iron trade with so cheerful an outlook As a rule orders are rigidly shut off at this period in view of stock-taking and the closing of accounts. But this year the contingency does not seem to have been even considered. Buyers are placing their orders wherever they can. There is now general agreement that delays are dangerous, and that the only safe course is to place orders as quickly as possible. Yet some of the buyers have waited already too long, and sellers will not accept contracts far into the new year, without a substantial premium on present prices. Thus, while £7 is the standard for unmarked iron, forward bookings are accepted only on the basis of £7 5s. It is the same with pig iron only "more so." Stocks, with the important exception of Commals, are practically wiped out. The result has been a remarkable upward run of prices, the New Cransley Co., Northampton, for example, lately booking at £3 for ordinary forge pig, a figure which a few months ago would have been scouted as absurdly impossible.

South Staffordshire is increasing its make of pig iron. In addition to a furnace lately blown in by Sir Alfred Hickman, Messrs. Bradley, of Tipton, are putting up larger furnaces, and the supercession of one opened not long ago is in contemplation. There are now 20 furnaces in operation in South Staffordshire, the largest number for many years. Every ounce of pig iron now available is eagerly bought up.

From all directions comes the same story. In the wagon building line, for example, the Metropolitan Amalgamated, which has a huge establishment at Saltley, has orders in hand to last it quite through next year. This firm has bookings practically in all parts of the world. More big orders have been placed also for tramway rolling stock, and in this line the outlook seems very bright

Gas Experiment Closely Watched.

From the economical point of view, a Black Country experiment is watched with great interest. It is now nearly a year since the Mond gas plant at Tipton was opened. This is an enormous undertaking established with the object of supplying gas for power purposes at from 2d to 3d per 1,000. Local manufacturers have not been in a hurry to connect up to the plant, mainly because this would involve in many cases practically a rebuilding of works, but at last a large firm is taking on the gas. This firm is Messrs. Bayliss Jones and Bayliss Tipton, who have recently been greatly extending their structural iron and steel work department. It is hoped that great economy of production will be effected, in which case other works will follow suit. Owing to its central position South Staffordshire badly needs some help of this kind. The gas question is almost absorbing attention here, several large firms are working day and night supplying plants for the production of suction water gas. The Birmingham Corporation have become so alarmed at this new development and the possibilities of Mond gas that they have lately made a substantial reduction in the price of gas to manufacturing users.

I mentioned in a previous letter the reversion to puddling, a process thought a few years ago to be approaching extinction. Owing to the scarcity of steel more and more iron is being used calling for more and more puddling furnaces. At the present time 15 furnaces are in course of erection. As showing the scramble for puddled bars, one firm whose stock in this line two months ago went begging at £4 7s 6d has just got rid of a quantity at £5 15s and could sell any quantity, if it had them, at the price. Steel billets are still scarce and dear, partly owing to the disappearance of the German product. In this direction, the tables are turned. The Germans have not only ceased sending billets but are now buying ship plates very heavily. One effect of this is that within a few weeks such plates have twice been advanced in price.

Great Armor Plate Plant.

Messrs. Camell, Laird & Co., of Sheffield, have just completed a new armor plate rolling mill which they claim is the largest in the world. The driving engines are 14,000 horsepower, each roll weighing 42 tons. The same firm has just had a huge ingot cast at the Brightside Foundry & Engineering Co.'s Newhall works, Sheffield, which weighed 84 tons, and the dimensions of which are 15 feet by 8 feet 6 inches.

Branch Plant near Washington.—The Firth-Sterling Steel Co., of Demmler, Pa., near Pittsburg, one of the largest manufacturers of armor piercing steel projectiles in the world, has purchased 300 acres of land on the Potomac river, opposite Washington, D. C., and will erect an immense plant at that place as soon as the necessary details can be arranged. The Firth-Sterling Steel Co., has been supplying the navy department with the highest grade 12-inch and 13-inch shells and to facilitate delivery and take advantage of the nearness to the navy yard and proving ground has decided to locate near Washington, but will still maintain its present plant at Demmler, Pa.

Changes in the Hanna Firm.—As contemplated by the late Senator Hanna, his interests in the firm of M. A. Hanna & Co., of Cleveland, have been withdrawn. His son, D. R. Hanna, continues his own holdings, however, and is the dominating factor in the firm, which is now composed of D. R. Hanna, R. L. Ireland and M. Andrews. Mr. Andrews has just been admitted to partnership in recognition of his long and faithful connection with the transportation department of the business.

The Household Foundry Co., Providence, R. I., has taken over the foundry department of the Household Sewing Machine Co. at that city and will turn out gray iron castings in loam, dry and green sand, castings in yellow brass, composition, phosphor-bronze and aluminum. A case-hardening and annealing department will be operated in connection with the plant. James E. Dick, late superintendent of the foundry of the Whittier Machine Co., South Boston, will be general manager of the foundry.

The American Pig Iron Storage Warrant Co., New York, reports that stocks in yards decreased heavily during December. The amount on hand Nov. 30 was 63,900 tons, the December receipts 2,600 tons, the December deliveries 9,300 tons and the amount on hand Dec. 31 was 57,200 tons.

The annual banquet of the officers of the Carnegie Steel Co. will be held at the Duquense Club, Pittsburg, next Saturday evening.

AMERICAN SHEET AND TIN PLATE CO.

Bray Becomes President, Pargny First Vice President and Davis Second Vice President.

The reorganization of the American Sheet & Tin Plate Co., brought about by the resignation of President John A. Topping to assume other important business obligations, has been announced. As was intimated by THE IRON TRADE REVIEW last week, Mr. C. W. Bray, second vice president in charge of the operating department, becomes president, succeeding Mr. Topping. Mr. Eugene W. Pargny, second vice president, in charge of the commercial department, becomes first vice president, succeeding Mr. Bray. Mr. S. A. Davis, formerly assistant to Mr. Bray as first vice president, becomes second vice president in charge of the operating department, and Mr. C. W. Bennett, formerly

EUGENE W. PARGNY.

district manager of the Indiana (Ellwood) district, becomes assistant to Mr. Davis in the operating department with the title of assistant to the president.

The advancements bring about some changes in the distribution of work, Mr. Pargny, in his new position of first vice president, still remains at the head of the commercial department, claim department, credit department, treasury department and traffic department, while the operating department is taken up by the second vice president, Mr. Davis. President Bray announced there would be no change in policy of the American Sheet and Tin Plate Co.

Mr. Pargny, the newly elected first vice president, is a Kentuckian and was born in 1867. His first connection with the iron and steel business in Pittsburg was with the Apollo Iron & Steel Co., 14 years ago, in the dual capacity of purchasing and sales agent. After the consolidation of the American Sheet Steel Co., Mr. Pargny was appointed district manager in charge of the Kiskiminetas valley mills, which include the Vandergrift plants, the largest sheet mills in the world. After the consolidation and formation of the American Sheet & Tin Plate Co., Mr. Pargny was elected second vice president in charge of the commercial department, where he has been for the past two years. During his incumbency the records have been broken each year.

OBITUARY.

Jas. MacNaughton, president of the MacIntyre Iron Co., died of pneumonia at his apartments in New York, December 29. He was a civil and mining engineer and was born in Albany in 1851. He had been prominent in engineering work and of late years had devoted most of his time to the care of the extensive lumber and iron properties owned by the company in Essex County. He was a member of the University Engineers' and Down Town clubs and of the American Society of Civil Engineers and the Society of Mining Engineers.

Teunis Garrett Bergen, an officer and director of several railway and transportation companies, died at Bay Ridge, Brooklyn, on December 29. He was born in 1856 and was a member of one of the oldest families in New York.

Benjamin Rowley, aged 80, one of the pioneer iron men of the Youngstown district, died at Indianapolis, Dec. 30. In 1830 he came to this country from England and was employed as a roller in one of the first mills in the valley. He acquired a considerable interest in the Cartwright-McCurdy mills, which afterwards became part of the American Steel Hoop Co. He was also heavily interested in the Youngstown Steel & Tube Co. which he helped organize.

George S. Moore, engaged in the iron business at Louisville, Ky., died at his home in that city Dec. 25 at the age of 73. Before the war he was a wholesale merchant but about 1865 he formed a partnership with George W. Morris as iron merchants, in which connection he was engaged at the time of his death.

W. W. Clark, who, until recent illness compelled his retirement, was one of the most active men in manufacturing circles of Canton, O., died Dec. 27, at the age of 74. For many years he was at the head of the Diebold Safe & Lock Co., president of the City National Bank, interested in the Canton Steel Roofing Co. and identified with many other enterprises at that place. His son, A. B. Clark, is engaged in manufacturing at Canton.

Aaron S. R. Overholt, 68 years of age, died at the residence of his son at Pittsburg, Dec. 27. In 1872 with B. Frank Overholt he went into the coke business, building a plant at West Overton, Pa. A son, Ralph Overholt, is sales agent at Pittsburg for the United States Cast Iron Pipe & Foundry Co.

David Hammond, one of the pioneer bridge builders of the country, died Dec. 27 at his home in Canton, O., at the age of 75. Mr. Hammond's entrance to the bridge business was in connection with the construction of the wooden type. Later with W. R. Reeves he formed the Wrought Iron Bridge Co, of Canton and began the building of iron bridges in 1864. Soon after the Canton Bridge Co. was organized in 1892 he became associated with it, becoming vice president, and was connected with that company until his death. Mr. Hammond's three sons, as well as a son-in-law, John R. Reed, and a grandson, F. C. Gardner, are all engaged in the bridge business, four being connected with the Canton plant.

The Pressed Steel Pole Co., Pittsburg, is distributing a catalog of 18 pages, describing pressed steel poles for trolley, telephone, telegraph and electric light service. The catalog describes and illustrates the various types of pole, giving dimensions and weights, and presents a number of tests made on these poles.

PERSONAL.

L. H. Mesker, formerly general sales agent of the Allentown Rolling Mills Co., Allentown, Pa., and previously superintendent of the Gas Machinery Co., Cleveland, and general foreman of the Macbeth Iron Co., Cleveland, is to be in charge of the branch office which is being opened in the First National Bank building, Cincinnati, by the Motch & Merryweather Machinery Co., Cleveland.

Gwavas F. Beckerley, C. E., has been engaged as contracting manager and chief estimator by the Noelke-Richards Iron Works of Indianapolis. He was formerly connected with the American Bridge Co. at Chicago, as contracting representative, and later with the Illinois Steel Co. of the same city. James A. McKim has retired from the works to assume a proprietary interest in the Westlake Construction Co., St. Louis.

James H. Nutt, for many years labor commissioner for the Republic Iron & Steel Co. with headquarters at Youngstown, resigned Jan. 1. With the exception of a short time spent as city commissioner, he has been connected either directly or indirectly with the Brown-Bonnell plant for thirty years. The position of labor commissioner has been abolished.

R. T. Pullen, president of the Herring-Hall-Marvin Safe Co., resigned Jan. 1 and retired after a service of thirty-one years with that company and its predecessors.

W. H. Hill, formerly connected with the Great Lakes Towing Co., has been appointed chief engineer of the fleet of W. H. Becker which will be increased during 1906 by four large boats.

Charles C. Tyler, general superintendent of the Allis-Chalmers Co. for the past two years, on Jan. 1 left to accept the newly created position of master of works of the National Cash Register Co. at Dayton, O.

Edward H. Rogers, for eighteen years connected with the Vinton Co., Detroit, has been appointed superintendent of a department recently created by the Detroit Ship Building Co. to have charge of the company's own work in cabin building, joining and decorating on freight vessels. Heretofore this work has been done by outside firms under contract.

Merritt C. Smyth, president of the Latrobe Steel Co., on the occasion of his retiring on the sale of the company's property to the Railway Steel Spring Co., was presented by the stockholders with $100,000 in recognition of his service of twenty-one years.

J. Wallace Page, a well-known manufacturer of wire fencing, is seriously ill at Adrian, Mich.

P. J. Brown, successor to the firm of Brown & Fogle, contractor and builder of fire and red brick work with a specialty of rolling mill and blast furnace brick work, is located at 661 Rose Bldg., Cleveland.

T. H. Simpson, vice president and general manager of the Michigan Malleable Iron Works, Detroit, Mich., has gone abroad for a three month's trip.

James B. Laughlin, of the Jones & Laughlin Steel Co., Pittsburg, has gone to Florida where he will spend the winter.

E. S. Rooney has been changed to the general offices of the Carnegie Steel Co. in Pittsburg. Mr. Rooney was head manager of the Cincinnati office.

Robert T. Lozier has been chosen district sales manager of the gas machinery department of the Power & Mining Co., 52 William street, New York. He will handle the American-Crossley engines and producers and the Loomis-Pettibone gas generators.

A. Eugene Michel is now with the Geo. H. Gibson Co., advertising engineers, Park Row Bldg., New York, having resigned as assistant advertising manager of the Standard Paint Co. Mr. Michel is a graduate of Rose Polytechnic Institute and his professional experience includes two years in the engineering department of the Diamond Chain Works of the Federal Manufacturing Co., charge of the testing department of the Ewart Mfg. Co., and the assistant managership of the department of publicity of the International Steam Pump Co., under Mr. Gibson. With the accession of Mr. Michel the Gibson staff of writers now includes three engineers who have had extensive practical experience.

Philips Isham of the New York office of Rogers, Brown & Co. sailed for Europe on December 20. He will be absent six or eight weeks.

Hillary C. Messimer, Stevens '96, and Donald Campbell, Stevens '97, have formed a partnership for the practice of patent and trade mark law with offices at rooms 607-8-9, 56 Pine street, New York.

U. S. Shelly, for many years a traveling salesman, has taken the position of general manager of the Ashland Steel Range & Mfg. Co., Ashland, O.

G. P. Bassett Jr., for the past three years resident manager in Pittsburg for Rogers, Brown & Co., tendered his resignation and left that company Jan. 1. The Pittsburg office is now in charge of James R. Darragh.

J. O. Barnett, who since July 1, 1901 has been purchasing agent for the United Engineering & Foundry Co., Farmers' Bank building, Pittsburg, has been appointed manager of the chilled roll department of the company's plant at Vandergrift, Pa., and will have his headquarters at the Pittsburg office and be in charge of the manufacture and sales of steel castings and brass. He will be succeeded as purchasing agent by Mr. H. A. Grusch, formerly assistant purchasing agent. Before becoming connected with the United Engineering & Foundry Co., Mr. Barnett was with the Frank Kneeland Machine Co., going with that company in 1894.

Russell G. Backus, who has been connected with the International Pump Co. for the past two years during the last of which he was connected with the Cleveland office, has resigned to accept a position with the Jeannesville Iron Works, Jeannesville, Pa., where he will be in charge of the turbine pump department.

Cement Meeting at Milwaukee.—The annual convention of the National Association of Cement Users, will be held, as originally planned, at Milwaukee Jan. 9 to 12 inclusive. The announcement last week that owing to a fire in the building selected for the machinery exhibit, the convention would be held at Columbus, O., brought out the fact that the Milwaukee branch had already made such extensive plans for its exhibit that it decided on an independent convention. The executive committee of the association met in Philadelphia and, on the assurance of the Milwaukee branch that adequate exhibit facilities would be provided, decided to return to the original plan.

The T. B. Wood's Sons Co., Chambersburg, Pa., incorporated for $240,000, has succeeded the firm of T. B. Wood's Sons as manufacturing engineers. The officers are: George A. Wood, president; Theodore M. Wood, vice president; Wm. H. Fisher, secretary; Charles O. Wood, treasurer; G. Herbert Wood, T. B. Wood Jr., and the officers, directors.

The Western Machine Co., Toronto, Can., is in the market for the following machinery; a planer 4 x 4 feet, two heads; a radial drill full universal 5 foot; a vertical mill 6 foot, 2 heads; and a special tool for turning the wrist pin of cranks. George McLachlan is president of the company.

A Modern Tool Steel Plant.

BY AN EDITORIAL REPRESENTATIVE OF THE IRON TRADE REVIEW.

E. T. CLARAGE.

The Columbia Tool Steel Co. in October 1904, broke ground at Chicago Heights, Ill., for its new mill, in which to manufacture various grades of tool steel, including self-hardening and a special high speed steel. The company had recently been formed by men who had seen a market in the west for a mill manufacturing tool steel. The company was formed by Mr. E. T. Clarage, who afterwards became its president.

The company owns a site of 8½ acres in Chicago Heights, Ill., 26 miles south of Chicago. The present mill covers but a portion of this site, although when the mill was built plans were drawn so that the plant could be extended, so as to cover the entire ground without in any way interfering with the scheme laid down for the progress of the work through the mill.

The main building is of brick 75 x 350 feet. It is 28 feet high to the eaves and 46 feet from the floor to the top of the ventilator. The building is absolutely fire proof. The roof is of tile laid directly on steel framing carried on steel trusses. The floor in some portions is of concrete and in others of iron plates. With the possible exception of some storage boxes there is absolutely nothing in the mill which can burn.

Provision for the extension of the building has been made by carrying the south side of the building on steel columns, and merely filling in between with brick to keep out the weather. The plans for extension contemplate placing a building exactly similar to the present one on the south side and adjoining it. When this building is built the brick filling will be knocked out of the present wall and there will be but one large building separated only by the steel columns supporting the roof trusses.

FIG. 2.—MELTING FURNACE, COLUMBIA TOOL STEEL CO.

FIG. 1.—EXTERIOR OF PLANT OF COLUMBIA TOOL STEEL CO.

Adjoining the main building are four other smaller buildings, namely a warehouse 75 x 50 feet; machine and repair shop 25 x 50 feet; a boiler house 50 x 50 feet, and a receiving and shearing room 50 x 50 feet. A side track from the Chicago Heights Terminal Transfer Railway runs into the yard. This extends along one side of the building connecting both with the receiving shed at one end and the warehouse at the other. The Chicago Heights

Terminal Transfer Railroad makes connections with thirty-nine trunk line roads entering Chicago so that the company has ample shipping facilities.

The raw material, which consists of muck bar and pure Swedish iron is delivered to the shear room from the railroad. It is then cut into small pieces by two motor driven shears and stored in separate bins in this room. Each bin

FIG. 3.— REHEATING FURNACE, COLUMBIA TOOL STEEL CO.

contains a different grade of iron, so that the proper selection may be made for making the various grades of steel. The proper proportions of iron for each grade of steel are taken from the bins and weighed into pans, from which the crucibles in which the tool steel is made are charged. Other ingredients, such as manganese, nickel, charcoal, etc. are weighed out in a small room on the opposite side

FIG. 4.—REHEATING FURNACE, COLUMBIA TOOL STEEL CO.

of the main building. These ingredients, called the "medicine," are placed in paper bags which are then carried over to the melting furnce. The iron and the "medicine" are packed in crucibles at the melting furnace and then placed in the furnace. The melting furnace is shown in Fig. 2. It is the Siemans-Martin type and was furnished by Wm. Swindell & Bros., Pittsburg. The furnace has five holes, each hole having a capacity of 6 pots. The furnace has a total capacity of 180 ingots, or 9 tons per 24 hours. The fuel used in the furnace is producer gas which is furnished by two producers which are located in a small sheet iron building outside the main building. After the contents of the crucibles have been melted the crucibles are withdrawn from the furnace and poured into ingot molds which are shown in Fig. 2 standing alongside the melting furnace.

After the ingot is cooled it is removed from the mold and a piece is broken from it in order to judge its carbon percentage by the fracture. The men who do this work become very expert in judging the steel from the fracture. A number of the pieces broken from the ingots are afterwards properly labeled and sent to the laboratory for analysis in order to confirm the judgment of the inspector.

Each particular kind of steel is carefully kept in a separate file from which the ingots are transferred to the reheating furnaces which heat them either for forging under the hammer or for rolling into bars and rods. These furnaces are shown in Fig. 3 and 4. That shown in Fig. 3 heats the ingots for the rolling mill and that in Fig. 4 for

FIG. 5.—ROLLING MILL, COLUMBIA TOOL STEEL CO.

the hammers, several of which are shown in the illustration. These furnaces are somewhat novel in that the waste gases from them are caused to pass through a boiler which is placed back of the furnace.

These boilers in conjunction with one other hand-fired boiler which is of 250 horsepower furnish all the steam used about the plant. This steam is used in the steam hammers, the dynamo engine and in the engine driving the rolling mill. The heating furnaces for the rolling mill and the hammers are located at opposite ends of the plant. Each furnace is fitted with a set of "telegraphs" by means of which the hot ingots are transferred from the furnace to the rolls or hammers. The rolling mill is shown in Fig. 5, and a portion of it, together with the engine driving it, is shown in Fig. 6. There are two trains consisting of three-high rolls, except the finishing rolls, which are two-high as usual. The ingots are passed back and forth through these until they are rolled the approximate size and section and they are laid on a cooling bed which is shown in Fig. 5, to cool. The rolls are driven by an automatic engine of 550 rated horsepower which is direct connected to one set of rolls and belted to the second set, as is clearly shown in Fig. 5. The bars, after rolling, are cut into proper lengths by means of numerous shears located in various parts of the building. There are four steam hammers in the mill, which are grouped about the second set of heating furnaces at the far end of the mill from the melting furnace. These hammers are of various sizes, namely: 750, 1,400, 3,500 and 6,000 pounds respectively.

Such sections as can be rolled conveniently are transferred to the hammers for forging to any desired shape. The building is spanned by a 7½ ton hand travel-

ing crane which is used for installing and replacing machinery, and for changing the rolls in the roll trains. The building is encircled by a narrow gauge industrial railway,

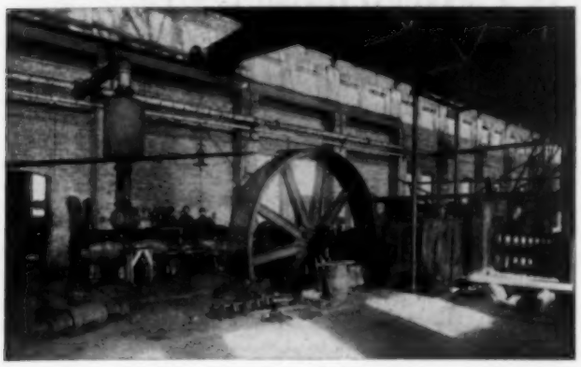


FIG. 6.—ENGINE AND PORTION OF ROLLING MILL, COLUMBIA TOOL STEEL CO.

facilitating the transfer of material from one end to the other. After the steel has passed through the various operations including annealing which is done in a special annealing furnace, it is taken to the store room, which immediately adjoins the mill, and which is shown in Fig. 7. It is properly labeled and then stored on end, in racks as shown. The rolled sections are cut to any desired lengths in this room in a motor driven cut-off machine which is not shown in the illustration. It is loaded from this room directly on to a car standing on the switch track outside the building. About one hundred hands are employed in the mill in two shifts.

FIG. 7.—STOREHOUSE, COLUMBIA TOOL STEEL CO.

E. T. Clarage, the present head of the Columbia Tool Steel Co., is a comparatively young man in business, being but 43 years old. He was born at Kalamazoo, Mich., where he completed the high school course, afterward taking a course in engineering. His work since leaving college has been both in the shop, in the office and on the road, so that the various phases of the industries with which he has been connected have all come within his experience. He was for six years foreman of a machine shop and for eight years following, salesman with the Crescent Steel Co For six years he was manager of the western branch of Sanderson Bros. Steel Co., which position he left to accept a similar one with the Crucible Steel Co. of America, where he remained for nearly four years. His connection with the Columbia Tool Steel Co., began in 1903 when he accepted a position as engineer of construction. As president of the company, Mr. Clarage brings to its management a wide and thorough knowledge of the steel business.

PASSAIC STEEL COMPANY.

Business Increasing Under Reorganization Plan.—Heavy Orders Recently Booked.

"With business enough ahead to keep us going full tilt for six months, orders still coming in and the output increasing, our prospects are brighter than they have been for some time," said Niven McConnell, recently elected president and general manager of the Passaic Steel Co. of Paterson, N. J. "We are now producing 5,000 tons of rolled products a month and a large proportion of that goes to our bridge shop which will soon be turning out 2,500 tons of finished material a month."

After passing through a trying period of reconstruction and reorganization during the past summer, this company is now, or soon will be, on a sound financial basis, and by April next the officers hope to present a statement which will be eminently satisfactory to the bondholders and stockholders of the corporation. The works have been thoroughly overhauled, the machinery being restored to a high state of efficiency and the arrangement altered and perfected so as to admit of the most economical handling of material.

The reorganization which was completed in October involved the issue of $1,000,000 of preferred stock of which nearly four-fifths has been subscribed and nearly one-half paid in. A committee consisting of James Eastwood, Thomas J. Arnold and Niven McConnell arranged with the creditors that those whose claims made up at least three-fourths of the total should take preferred stock to the extent of at least 37½ percent of their claims, each subscriber to receive in addition to the preferred stock trust certificates for common stock at the rate of two and one-half shares of common to each share of preferred stock. In behalf of the creditors' committee J. A. McGregor, assistant secretary and treasurer of the Bethlehem Steel Corporation, made an examination of the company's books and prepared a complete statement of the Passaic Steel Company's affairs. The company is now doing business on a cash basis.

A statement of the company's quick assets showed at the beginning of November a total of $500,000 in excess of current liabilities, and since then operations have netted a profit. The outstanding common stock is $5,000,000; first mortgage bonds, $2,500,000, and preferred stock subscribed for, $784,145.50

The officers of the reorganized company are: President and general manager, Niven McConnell, who built the plant at Donora, Pa., for the Union Steel Company and has been connected with the Passaic Co. since April 1, 1905; secretary, F. A. Shick; treasurer, J. B. Cooke. The executive committee includes, besides the president, secretary and treasurer, the following: W. D. Zehnder, president of the Scranton Bolt & Nut Co.; Hon. Benj. K. Focht, of Davis & Focht, Sunbury, Pa., and director of the National Deposit Bank, Philadelphia; W. A. Arnold, president of the American Silk Dyeing and Finishing Co., Hawthorne, N. J.

The efficiency of the works is gradually being increased and the production for the past two months has established a new record for the plant. The company is securing some of the handsome premiums now being paid upon small lots of structural steel and has booked a satisfactory share of recent new structural business. It is just finishing up a new four-track bridge built for the New Haven & Hartford Railroad at Cos Cob, Conn., which required 2,538 tons of steel. Among the contracts secured during the past ten or fifteen days is one for material for the Dupont Powder Co., at Wilmington, Del. 1,300 tons; one of 435 tons for a sugar refinery at San Francisco for the Oxnard Construction Company.

CHICAGO IRON MARKET IN 1905.

GROWING IMPORTANCE OF THE CITY AS A MANUFACTURING CENTER.

Large Amount of New Construction Planned and Under Way.—Ups and Downs of Prices—Many Interesting Features.

BY GEORGE H. GRIFFITHS.

A general survey of the year reveals some interesting developments in the iron and steel trade. The year opened with a most encouraging outlook. All prices were firmly fixed with indications of early advances. In every direction activity was growing; order books were comfortably filled, and specifications were heavy. The last three months of 1904 witnessed a gradual improvement from the see-sawing conditions that had prevailed during the greater portion of that year; and with the ushering in of 1905, the market was established on a firm basis. Generally speaking, it has been a record-breaking year. Never have mills and furnaces labored under such a tremendous demand for their products as in the last six months; the impetus of which will maintain the status quo far into the new year. With scarcely an exception, producers of iron and steel—whether of crude, intermediate of the finished kind—have orders on their books and live specifications in hand that will tax the capacity of their plants for six months to come. There are no stocks anywhere to speak of, every ton going into immediate consumption.

Steel Corporation's Influence.

No better example than the conditions of the past year is required to illustrate the need of a powerful controlling force in the regulation of the iron and steel market. But for the influence of the United States Steel Corporation in resisting every tendency to unduly advance prices, a run-away market would certainly have been the outcome of the unparalleled consumption that has marked the year under review. There were two distinct price movements in this period. One on products which maintained their strength to the close, or perhaps advancing slightly late in the year, but generally resisting an inclination to advance; the other on materials which suffered some decline during the summer months but closed the year at higher prices than those at which they started. Each movement was clearly defined; the steadier of the two embracing rails, structural shapes, plates, steel bars and kindred materials in which the Steel Corporation is the predominating factor; while vacillation was marked in pig iron, sheets, iron bars, and those other materials wherein there is not such close centralization of production as in the former. These metals fluctuated with the changing conditions in the avenues of their consumption, and gained momentum only by the sheer strength of the heavier materials.

The Record of Price Changes.

The earliest price changes were advances. In January, light rails and merchant pipe were each put up $1 a ton, and boiler tubes $4 a ton; during February another advance of $1 a ton was recorded in merchant pipe, and advances were announced of $1 a ton in wire products; from $1 to $2 a ton on sheets; $2 on plates, and $2 on structural shapes. The following month advances were made of $2 in wire rods, $2 in hoops; $2 a ton on box annealed sheets, and $1 a ton on blue annealed sheets. By spring the buying had become so active in many lines of finished steel that the trade for the year was fixed. Some producers were embarrassed by the congestion of specifications, and it was impossible to make the deliveries required. Jobbers of structural shapes complained that the mills were not furnishing material on contracts in proportion to the volume they were shipping from stock; and before the year closed Chicago interests were scouring the country picking up odd lots wherever they could, which, in self-protection, they were forced to sell at prices ranging from $5 to $10 a ton above the official schedule. Billets, wire rods and sheet bars became extremely scarce, and the Illinois Steel Co.—the largest producer of Bessemer and open-hearth steel in this section—had to buy several large lots from outside producers for its own use. Weekly reports showed one unending series of unfilled requirements for steel, and Macedonian cries for help from all along the line were heard. The buying of standard sections in this period was exceptionally heavy. The new plan of making the price uniform at $28 f. o. b. mill, with full freight to point of delivery added, proved particularly advantageous to the mills at South Chicago, since the buying for delivery at this city or farther west greatly exceeds the volume of business for other sections. Before the end of March, the capacity of the local mill, some 600,000 tons, was sold up for the year, and orders received thereafter for 1905 delivery had to be diverted to eastern plants.

Period of Downward Tendencies.

April saw the first indications of weakness. Demand for pig iron slackened, and inquiry for bar iron and old material, the products which quickly reflect the uneasiness of buyers, also fell off. The following fourteen weeks was the period when the prices were on the downward grade. Demand for materials and for the several forms of light finished steel gradually declined until the market was almost at a standstill. Pig iron had been held on the basis of $13.50 Birmingham and $17.50 Chicago for Southern and Northern No 2 foundry respectively since the first of the year. In May the first break in prices occurred. Thereafter values gradually receded, until in June Southern No. 2 touched $10.75 Birmingham, and Northern No. 2 $15.75 Chicago, after which the tide turned. During January and February, bar iron had sold at 1.65c Chicago, or about $2 a ton above steel bars. In March, prices were reversed, and while steel grew in strength, iron declined. Competition was strong among the western mills, and when old material and pig iron became weak bar iron immediately followed. The downward grade continued until July, when the open quotation was 1.50c though contracts were closed below that figure. The advance during the last six months of the year was more rapid than the previous decline and reached its climax when the leading producer late in November quoted 2c Chicago, an advance of $10 a ton from the summer quotation.

Wire products were firm most of the year. In January, wire nails were quoted at 1.90c Chicago, and in December 1.95c. During the summer months the official schedule was shaded in the competition prevailing, but the strength of wire rods helped restore prices. The production and consumption of finished wire during the year were both very heavy, and the year closes with mills in excellent shape. Sheets are classed among the most ragged of all finished materials. In March, No. 28 gauge

black was quoted at 2.40c Pittsburg, having advanced $10 a ton since the first of the year, but between April and October declined until 2.20c Pittsburg for this gauge was the ruling quotation, though on desirable specifications some mills would even shade this low price at times. In the closing days of November, the American Sheet & Tin Plate Co. put out a new schedule based on 2.30c Pittsburg for No. 28, and with slight exceptions it is uniformly maintained today. Merchant pipe started off with an advance of $1 a ton in January, and trade for several months was firm and active. Then followed a severe war in prices, which resulted in heavy reductions. Partial improvement followed and prices are now considerably higher than in summer, though not up to the level of the early months of the year.

Turning Point in Midsummer.

Midsummer was the turning point of the year. The tremendous buying of pig iron in July when 250,000 tons changed hands in this market in less than two weeks awoke the metal world with a start and completely turned the direction of prices. Immediately orders commenced pouring in for all kinds of materials. Consumers who had previously been dilatory in specifying against their contracts now pressed eagerly for shipments and many placed supplementary contracts. The United States Steel Corporation began buying pig iron at this time and clinched the strength for that product for the balance of the year. Prices of crude metal and the lighter forms of finished material moved upward more rapidly than they had previously traveled downward. Again, late in August when the price of steel rails for 1906 delivery was announced, there was an even more sensational period of buying. Within one week contracts for 300,000 tons of rails were closed at Chicago, and in less than a month the Illinois Steel Co. had completely sold its output for the whole of next year. Never in the history of rail manufacture in America was there such pnemonenal buying of rails as in these two weeks. The local mill could not take care of all the business offered, and has diverted to the other plants of the Corporation an exceptionally heavy tonnage. A feature of this buying was that some railroads with transcontinental plans specified delivery of the first quotas in 1905, to accomplish which necessitated record rolling operations on the part of the local mill. It succeeded, however, in completing its 1905 contracts before the first of December, and since that time has been rolling on 1906 business.

Shipbuilding Revival.

Shipbuilding interests were not slow in following the cue of the land carriers. This industry had awakened during the year as from a long sleep. Every shipyard was a hive of activity. In the fiscal year ending June 30, twenty-five vessels with a carrying capacity of 190,400 tons were built on the Great Lakes, and in seaboard shipyards forty vessels with a gross tonnage of 139,248 were constructed. The number of vessels under contract on the Great Lakes at the present time is thirty-seven, of about 370,000 tons carrying capacity, while a number of coast shipyards have excellent contracts. These figures do not take into consideration small craft such as scows and tugs, for which many orders have been placed. As a modern ore carriers requires about 5,000 tons of plates and structural shapes in its construction, the steel requirements of the shipbuilding industry can easily be estimated.

Structural Steel.

There were only two advances in structural steel during the year, one in February and one in September, each of $2 a ton; and the only advance in plates during the year occurred in February, also of $2 a ton. Every indication pointed to a tremendous consumption of both these products. Demand for them was heavy from the beginning, but after the advances in February it grew by leaps and bounds. Jobbers and construction shops contracted as far ahead as the mills would let them; railroads and builders did likewise and the specifications continued in ever increasing quantities. The scarcity of shapes become very pronounced during the summer and autumn months and many enterprises had to be postponed for the lack of material. Late in the year the new structural mill of the Illinois Steel Co. at South Chicago started up, but not a ton of new business was booked for it, nor has any been taken since, the entire output being applied on existing contracts of the Corporation. Repeated efforts were made in the summer months by independent producers of these products to advance prices commensurate with the extraordinary demand, but they met with no encouragement from the Steel Corporation and each time were defeated.

Strong Demand for Bars.

Steel bars were strong thoughout the year. The only official advance occurred late in February and consisted of $2 a ton—from 1.56½c to 1.66½c. There was active buying prior to the advance, most of the large western consuming interests contracting up to July 1, so that new business was light in succeeding months. The specifications, however, were tremendous, far surpassing the ability of the mills to fill. Leading makers were six months behind in their orders, and for early deliveries there was soon developed a market at varying premiums. As in plates and structural shapes, there was great pressure to advance the price in late autumn, but the leading interest continued to book orders at the old basis up to the close of the year, thereby defeating all of these attempts.

Heavy Tonnage on Books.

The new year comes with a heavier tonnage on the books of the mills than ever before at the beginning of January. There are a few exceptions, but they are not many. All the heavier products, like steel rails, plates and structural shapes are sold far through the coming year, and for some of the lighter forms of material there is the same flattering prospect. In lines where it is usual to accumulate stocks during the winter months for spring trade, there has been scarcely the beginning of a surplus, for the output of mills has gone regularly into consumption until late in December. Wire and nails have been shipped to the country in almost undiminished quantities throughout the closing months of the year.

Chicago's Manufacturing Interests.

Chicago has always been the most important distributing center in the country. Gradually it is also coming to be regarded as an important iron and steel producing center. Its lake frontage and nearness to the ore mines of the northwest, as well as its unrivaled railroad facilities, are advantages that more than off-set its inadequacy in coal and coke resources. This is a drawback that can be overcome by physical means. The completion of the 120 by-product ovens at South Chicago and 160 ovens at Milwaukee, will furnish substantially an output of 275,000 tons of foundry and furnace coke per annum, a tonnage which will add greatly in relieving the dependence of the western foundry trade on the Connellsville market and make possible freer and heavier shipments from that point to the blast furnaces and mills of this district.

The iron and steel needs of the west have grown tremendously, especially in the last two years, but during the year under review the discrepancy between supply and demand became most marked, and forcibly attracted the attention of producers. Extensive additions to the pig iron and steel output are urgently needed, and new plants are rapidly being built Three blast furnaces are under construction at South Chicago, one by the Illinois Steel Co., making 11 in all operated by that company; one by the Iroquois Furnace Co., which

brings its total up to three, and one by the Federal Furnace Co., a newly organized corporation. At Mayville, Wis., a second furnace is being built by the Northwestern Iron Co., of Milwaukee, and at Joliet, Ill., the Illinois Steel Co. contemplates the erection of a fourth stack early in the new year. The plans of the Illinois Steel Co., for the erection of a large steel works at Tolleston, Ind., a town about 10 miles from South Chicago, are the most interesting in this connection. This company completed within the year a structural mill and seven 50-ton open-hearth furnaces at its South Works, and has under construction there seven more open-hearth furnaces. The need for a greater output of open-hearth and Bessemer steel however, has become evident, and it is stated the new works will provide ample capacity in this direction, as well as mills for the manufacture of billets, rails and steel bars.

The Pig Iron Trade.

We give below a more complete summary of the pig iron trade for the year because of the tonnage and diversity of manufacturing and consuming interests represented in it.

Pig iron conditions at the beginning of the year were strong. Prices of both northern and southern brands had risen about $4 during the last three months of 1904, and the opening of the new year found northern interests quoting on the basis of $17.50, Chicago, for No. 2 foundry, while $13.50, Birmingham, was the usual price for No. 2 southern foundry. These prices held almost stationary during the first four months of the year, fluctuating slightly one way or the other, but coming back to that basis. During January the conditions in the south looked like higher prices. There was a coke shortage in Alabama, for the effects of the strike in the coal mines during the summer of 1904 had not been wholly overcome. High silicon irons especially were scarce, some furnaces having been compelled to use inferior cokes during the strike. Early in January the leading southern brands were advanced 25 cents a ton and a few weeks later their makers were trying to get $14 Birmingham, but the buying was of a listless character.

The inquiry became heavier in February and the indications were for a more active market. Melters, however, were chary, and after testing the market postponed buying; a slump was imminent and might have come had not the tone become more buoyant. Crude and rolled steel were strong and furnace interests looked for a similar buying movement in pig iron. Early in March there was considerable talk of an advance, the sales in the middle of that month being heavier than at any time since the previous November, important consuming interests contracting largely. Northern producers were willing to sell for deliveries extending through the year, but the southern interests restricted contracts to the third quarter. However, before the end of March one or two of the more daring southern makers concluded to sell for fourth quarter, and a number of moderate contracts were placed in that month on the basis of $13.50, Birmingham for No. 2 foundry.

The feature of the pig iron trade in April was the purchase of about 60,000 tons of iron by the International Harvester Co. for deliveries between July and December, more than half to be northern iron and the balance to be shipped from southern furnaces. Buying by this large consumer has usually been followed by extensive purchases from smaller melters. But because of the currency of reports that this iron had been bought at a considerable reduction from prevailing prices, buyers decided to wait a while before covering for the last half. The inquiry for malleable iron was active late in April, but only about 15,000 tons were bought, or one fourth of the inquiry.

Decline in Demand.

Early in May the demand for pig iron fell off to such an extent that all furnaces in the south offered to consider bids from melters on their requirements for the balance of the year. This action only accentuated the fear of lower prices, and as the market developed additional signs of weakness, the trade continued its policy of watching rather than participating. By the middle of May, southern iron had weakened from 50 cents to 75 cents a ton, and northern iron 50 cents a ton, and the former could be bought at $13 Birmingham, and the latter at $17 Chicago. The local furnaces by their foresight in accepting business farther into the future, were better protected and were less anxious for contracts than the stacks below the Ohio river.

It became plain in June that some of the southern furnaces had on hand a tonnage of iron which they wished to move. It was intimated that $12, Birmingham, would not be unsatisfactory. This price was considered only for spot shipment and was not applicable on contracts. As the month advanced prices fell still lower and the end of June saw southern iron selling at $11.50, Birmingham, or $15.15 Chicago, and northern at $16 to $16.50, a decline of $2 and $1.50 respectively in the first six months of the year. Occasionally a lot of several thousand tons was sold, which inspired the hope that heavy trading would follow towards the end of the month, when many semi-annual contracts expired. But the melters made inquiries for good round lots, and when prices were obtained bought sparingly.

Heavy Buying.

The first of July arrived without the expected buying movement in sight, and with prices still receding. There was a fair amount of trading in the closing days of June, and the opening week of July, but the tonnage was disappointingly small. Melters continued to bear the market during the month and succeeded in forcing southern No. 2 down as low as $10.75, or $14.40, Chicago, and northern No. 2 $15.75. This constituted the turn in the tide; many bought but many failed to realize their opportunity. Buying became heavy immediately afterwards. Tremendous sales of iron were made at Birmingham, largely to the pipe works. These sales were followed by one of the swiftest and most extensive buying movements of pig iron in the history of the trade. The Chicago district furnished its full quota to this activity. During the later half of July about 250,000 tons of pig iron were said to have been bought here. Prices soon began to harden, and farseeing foundrymen bought liberally for their requirements during the last half of the year. There was a rebound upward of $1 a ton in a short time, and by the first of August southern iron was firmly intrenched at $12, Birmingham, and local irons at $16.50 to $16.75, Chicago.

Market Becomes Very Strong.

At these figures the market held without much change during the next six or seven weeks. Active buying ceased about the first of August, a decline largely the result of an indisposition of furnaces, particularly those in the north, which found they had sold more heavily than expected, to taken on additional tonnage. This precipitated some alarm as to wants for the early months of 1906, and about the middle of September another buying movement forced itself into being. In one week inquiry sprang up for close to 100,000 tons of iron, most of it for needs in the first half of the new year. It embraced every grade of iron. This trading culminated in the withdrawal from the market of the two largest southern producers and a number of others for deliveries in the balance of 1905. Prices began to harden. By the first of October leading southern brands were held at $13.00 to $13.50 Birmingham, and northern irons had advanced to $17.50. Early in October the International Harvester Co. bought 50,000 tons for deliveries through the first half of 1906. From other sources, including some malleable purchasers, another 50,000 tons was traded in. By the end of October, northern and southern irons had advanced 50

cents a ton each, and were strong at $17.65 and $18 Chicago, respectively. Iron was now very scarce and producers were unwilling to sell. Demand revived sharply during the closing week of October.

In November further strength appeared. The impetus of the revived inquiry, with so little iron offered, sent prices still higher, and by the middle of that month the local product was selling at $19 to $20 and southern at $18.15, or $14.50 Birmingham, for No. 2 foundry. These prices continued for the remainder of the year, though sales of southern brands were occasionally made on the basis of $15 Birmingham. New business subsided to a great extent in December,though melters were as eager as ever to rush the deliveries of their contract quotas or have them anticipated.

AVERAGE MONTHLY PRICES FOR THE YEAR 1905, CHICAGO.

	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Lake Supe'r Char. Iron	18.50	18.50	18.50	1 .25	17.25	17.15	16.30	17.00	17.25	18.00	19.50	20.00
Nor. No. 2 Fdry....	17.50	17.50	17.50	17.50	17.75	16.60	16.15	16.35	16.50	17.55	18.90	19.50
Sou No. 2 Fdry....	17.15	17.15	17.15	17.15	16.85	15.75	14.95	15.50	15.60	16.50	18.05	18.15
Bar Iron....	33.00	33.00	31.60	31.50	30.50	30.00	30.00	32.40	33.60	35.00	36.60	37.00
Rails.....	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00
Tank Plates	31.30	32.30	32.30	34.80	35.30	35.30	35.30	35.30	35.30	35.30	35.30	35.30
Sheets No.28	49.30	49.30	50.50	51.30	50.80	49.30	47.30	47.30	47.30	48.30	48.30	48.30
Old Rails..	21.00	21.15	19.50	19.50	19.00	17.90	17.15	18.60	19.30	21.75	23.00	23.00
" Wheels	16.35	16.50	16.25	15.85	14.65	14.20	14.15	15.20	16.50	17.00	18.00	19.25

A METHOD OF SURVEY FOR SECONDARY MINE OPENINGS.*

BY FLOYD L. BURR, VULCAN, MICH.

One of the problems encountered by most mine surveyors has to do with the location and alignment of those mine openings which, from the surveyor's point of view, might be termed "secondary openings." These "secondary openings" are chiefly raises, winzes and stopes, but often include short or crooked drifts more or less remote from the principal workings, or only with difficulty accessible from the regular levels. It is not to be implied that these places are unimportant, for indeed they are often times of the very greatest importance in the exploration, development and exploitation of the ore. However it is not usually necessary to make elaborate surveys of these places, determining all azimuths and distances with the same degree of accuracy as is required for the general survey of the mine. In short, these openings must be correctly but not accurately located.

Of course all this work can be done with a transit in the usual way, and I believe most beginners would be inclined at first to do it in that way. In the great majority of cases, however, the use of the transit in such places involves so much danger to man and instrument, so much general difficulty in taking steep sights and so great an expenditure of time in the building of stagings and in the setting up the instrument in cramped, wet, dirty places, that it is impracticable.

In resorting to hand instruments, the angle in the vertical plane offers no difficulty as almost any clinometer is capable of giving sufficiently close results. But the matter of the azimuth is not so easily disposed of. Usually the compass is used, and occasionally with good results, but it is not reliable. In working around these cramped, crooked places one cannot readily eliminate the effect of pipes, drills, etc., which are generally present and often hidden.

Having encountered a goodly number of these problems, I have finally settled upon the following scheme, which I believe serves the purpose better than anything else. As far as I know, no one else has ever tried it in this form. The idea is an outgrowth of the old Cornish method of stretching wires or strings from one point to another and hanging compass or clinometer from these strings, thus determining the magnetic bearings and the vertical angles of all the lines. This method is cumbrous and has the same old inherent fault of depending upon the magnetic needle. I believe further that it would be difficult to use it on lines steeper than 30° or 40°. My plan is to stretch a strong, smooth string from one point to another, taking in usually, at one setting, all points of the proposed traverse. The angles between the portions of the strings are determined by measuring with a steel tape line from the vertex out to each of two "riders" placed one on each string at suitable distances out, and then measuring across from one "rider," to the other. It is obvious that by the measurements the angle is determined and it only remains to lay it out. When the angle is in an approximately horizontal plane, as would usually be the case, in the survey of a drift, there is nothing more to be done. When one or both legs of the angle are inclined, as in the survey through winze or rise, it will be in an inclined plane and further observation is necessary in order to determine the horizontal projection. The vertical angle of each leg must be found. This may be accomplished—and this is my usual practice—by holding the straight edge of a clinometer lightly up against the under side of the string and setting the instrument by successive approximations. For this I use Brunton's pocket mine transit, but some other clinometer would do as well. In the absence of a clinometer, a plumb bob may be suspended from the vertex or from a point vertically over the vertex, a "rider" placed on the plumb line and measurements made to each leg of the angle.

Only a fairly smooth string, uniform in size, should be used, and of course it must be wound on some kind of convenient reel, such as any blacksmith can easily make. It is desirable to have as much as 300 or 400 feet of string. I carry with me a small spool of No. 22 soft copper wire for "riders," merely breaking off a piece two or three inches long and giving it one or two tight close turns around the string.

Nails or spikes driven into the sides of drifts or raises or into convenient timbers serve for points, the string being given one or two turns around the nail under the head. Care must be taken to have string entirely free between points. For maximum accuracy the points should be so chosen that the angle should never exceed 160° though very fair work may be done with it greater. Obviously, the farther the riders are placed from the vertex, the more accurate the determination. Generally the distances are about five or six feet. Measurements should be taken very carefully and to the nearest 1-200 of a foot. The intersection of the lines of the two strings is the vertex. It is not necessary to avoid wet, dirty places. Special arrangements of the strings will suggest themselves for special situations. The notes may be kept in any convenient form, but must record whether the deflection in the horizontal plane is to the left or right. In the office the angle is to be determined graphically by laying off the three measurements to a suitable scale, say one foot to an inch, and measuring the resulting angle with a protractor.

Probably the most satisfactory solution for ordinary work is by pure graphics.

The accuracy of this string method is fully as great as is necessary for the work for which it is to be used. With ordinary care the horizontal angles may always be determined within one degree of the truth and often within ten minutes.

*Paper read at Lake Superior Mining Institute, October, 1905.

PROSPEROUS YEAR FOR SOUTHERN FURNACES.

PRICES OF PIG IRON AT NO TIME DECLINED TO UNPROFITABLE BASIS.

The New Year's Beginning Much Like That of the Early Days of 1905.— Increasing Use of Its Own Product By the South.

BY JOSEPH D. MORTEN.

The year 1906 begins under strikingly similar conditions to those prevailing at the beginning of 1905, so far as the southern pig iron market is concerned. The year 1905 began with buyers well covered over the first quarter of the year, with the ruling quotation for southern iron $13.50 Birmingham for No. 2 foundry. There had been a good buying movement, and furnace interests were maintaining prices waiting for a resumption of buying. How far ahead buyers' purchases would carry them was the problem then, the same as it is now.

In 1905, it developed that consumers had bought enough iron to carry on a long and tedious waiting campaign, resulting in lower prices, by the time they were again ready to enter the market.

The year may best be studied by dividing it into four periods which furnish a ready index to the course of the market as follows:

January 1 to May 1: Southern iron $13.50 Birmingham. Market dull. Buyers taking iron on contracts. Heavy production indicated. Buyers holding off and furnaces equally complacent about future tonnage.

May 1 to July 1: Furnaces more inclined to seek business, under accumulating stocks, resulting in invitations to make firm offers. All business in sight eagerly sought and prices declining rapidly down to $10.50 to $11.00 Birmingham.

July 1 to October 1: This period witnessed two of the heaviest buying movements the market has ever seen. The first ocurred about July 15, and the second and heaviest buying was at the close of September. The July buying was on the basis of $10.75 to $11.00 Birmingham, and the September purchases were at 11.50 to $12.00 Birmingham basis. This buying movement advanced prices to $12.50 Birmingham.

October 1 to December 31:. There was a steady run of buying in the early part of this period, which took up a large proportion of the offerings and prices advanced gradually and without excitement to $14.00 Birmingham. Toward the close of this period buying stopped, with buyers well covered for the first quarter of 1906, and many covered through the first half of the new year.

It is worthy of note, that the developments of the year 1905, have made it clear that southern pig iron has been marketed and consumed in the south on a steadily increasing scale. A careful estimate after an investigation made by Mr. Chas. A. Stillman, the Birmingham representative of Rogers, Brown & Co., warrants the statement that the south has consumed 52 per cent of the pig iron made in that section, against 30 per cent five years ago. This has been brought about by the establishment of a great number of new industries in the south, which consume pig iron in the enlargement of old plants, whose productive capacity has been doubled in many cases. Plans are now being considered by important interests looking toward a further development in the same direction.

A notable fact concerning the past year, has been the continued prosperity in the pig iron business. At no time during the year have prices declined to an unprofitable basis, and a large proportion of the business gave the furnace interests satisfactory profits. This is especially significant when account is taken of the increase in production. The preliminary estimate of the chief state mine inspector of Alabama, indicates that the total make of pig iron in that state, has been approximately 1,500,000 tons, or about 250,000 tons more than was produced in 1904. The yield of coke has also broken all records, and the outputs of steel, cast iron pipe and finished iron of all description have been in larger quantities than ever before.

This great development has had to contend with a scarcity of labor in the iron producing districts, and some annoying labor troubles, but it appears that the southern producer is becoming increasingly better able to cope with this feature, and there is reason to hope for a more satisfactory labor condition in the south for the new year, as employing interests will apply their knowledge gained from experience in the handling of this question.

In the marketing of southern iron for a considerable part of the year, the price in the south was held sufficiently high as compared with northern product, to give the northern producers a price advantage at practically all points in Ohio excepting Ohio river crossings. It was also notable that a large quantity of southern product was sold in Chicago, as the Chicago district afforded relatively better prices for southern iron, than other consuming centers.

Plants Completed Since June 1, 1904.

The Bulletin of the American Iron & Steel Association publishes the following list of rolling mills, steel works, bloomaries, and tinplate and terne plate plants completed and put in operation, with a few exceptions, since June 1, 1904.

Rolling Mills and Steel Works.

Baldwin Steel Co., 107 John street, New York. Works at Cold Spring-on-Hudson, New York. Built in 1903; one 24-pot crucible steel-melting furnace; first steel made in August, 1903; first products rolled in Feb. 1905; two annealing furnaces, two gas producers, five heating furnaces, four hammers, (one 750-lb., one 1,100-lb., one one 2,500-lb., and one 4-ton,) and one 12-inch train of rolls; product, high-grade tool steel; annual capacity, 1,800 tons of crucible ingots and 1,800 tons of finished products.

Brooklyn Navy Yard, Bureau of Construction and Repair, Brooklyn, New York. One 2-gross-ton Tropenas steel converter and one cupola built in 1904 and first steel made December 19, 1904; product, steel castings for ship work for the use of the United States Navy; annual capacity, about 1,200 tons. Fuel, coke.

Riverside (The) Foundry, 451-73 Riverside avenue, Newark, New Jersey. Original works built about 1885; twelve 4-pot Siemens crucible steel-melting furnaces added in 1901 and first steel made May 20, 1901; abandoned in 1902; acquired by present owners in January, 1905, and first steel castings made February, 1, 1905; product, steel castings from 1 pound to 800 pounds; annual capacity, 600 tons.

American Duplex Steel Co., 715 Park Row Building,

New York. Works at Bradford, Pa. Built in 1903-4; one special 20-gross-ton semi-open-hearth steel furnace and two patented converting annealing furnaces; product, "Duplex Steel" castings and malleable iron castings; specialties, connecting rods, gear wheels, oil-well supply castings, etc.; first castings made June 1, 1904; annual capacity, 5,000 tons of "Duplex Steel" and malleable iron castings.

Ambridge Plant, American Bridge Co., Pittsburgh. Works at Ambridge, Pa. One 15-gross-ton acid open-hearth steel furnace added to bridge-building plant in 1905 and first steel made May 16, 1905; product, steel castings; annual capacity, 5,000 tons.

Crucible Steel Casting Co., Lansdowne, Pa. Built in 1905; two 8-pot crucible steel-melting furnaces; first steel made July 25, 1905; 16 pots are used at a heat; product, all kinds of steel castings; annual capacity, 500 tons. Fuel, oil.

Fort Pitt Malleable Works, Fort Pitt Malleable & Grey Iron Co., McKees Rocks, Pa. Two 15-gross-ton acid open-hearth steel furnaces and 15 annealing furnaces; product, miscellaneous malleable iron castings but steel castings could be made; annual capacity, 10,000 tons of malleable castings. Fuel, gas.

General Castings Co., Verona, Pa. (a suburb of Pittsburgh). Built in 1904-5; one 20-gross-ton Smythe acid open-hearth steel furnace; first steel made April 4, 1905; product, steel castings for railroad and jobbing work; annual capacity, 14,400 tons. Fuel, natural gas.

Hydraulic Machine Co., Pittsburgh. Two 15-gross-ton open-hearth steel furnaces (one acid and one basic); product, steel castings. Also makes iron and brass castings and builds rolling mill and steel works machinery.

Interstate Steel Co., Brackenridge, Pa. Built in 1903-4; 6 sheet and pair furnaces, 6 annealing furnaces, two 26-inch hot mills, and one 22-inch cold mill; first cold-rolled products made Dec. 21, 1903, and first hot-rolled products June 16, 1904; product, black sheet steel and uniform colored polished blue sheets; annual capacity, 19,000 tons.

Latrobe Works, Firth-Sterling Steel Company, lessee, Pittsburgh. Works at Latrobe, Pa. Built in 1904-5; one 48-pot crucible steel-melting furnace; first steel made February 7, 1905; product, crucible steel ingots; annual capacity, 3,000 tons. Fuel, natural gas. The works are owned by the Burns Uniform Steel & Metallic Co., 315 Lewis Building, Pittsburgh. On October 1, 1905, the crucible department was leased for one year to the Firth-Sterling Steel Company. The works are also equipped with 3 hammers (500-lb., 1,100-lb., and 2,500-lb.) and 3 heating furnaces, which are operated by the Burns Company; product, all kinds of tool steel; first hammered products made March 9, 1905; annual capacity, 500 tons. Fuel, natural gas.

Meyersdale Sheet Steel Co., Meyersdale, Pa. Construction commenced in July, 1904; put in operation in the spring of 1905; one double annealing, 2 heating, and 2 sheet furnaces and 3 sheet mills (two 26-inch hot and one 20-inch cold); product, light steel sheets and range plates; annual capacity, 8,000 tons.

National Transit Co., Oil City, Pa. One 4-gross-ton special acid Bessemer converter, one crucible steel-melting furnace, one 1,000-lb. Schwartz furnace, and 4 cupolas; product, steel, brass, bronze, and iron castings for the use of the company. Fuel, oil, coke, and coal.

Pottstown Works, Stanley G. Flagg & Co., 424 North Nineteenth street, Philadelphia. Works at Pottstown, Pa. Built in 1895; equipped with several cupolas, 7 annealing furnaces, and one 12-gross-ton acid open-hearth steel furnace, the latter added in 1899; product, malleable iron castings but steel castings can be made; annual capacity, from 5,000 to 6,000 tons. (The company also operates a plant in Philadelphia, known as the Union Works, which is equipped for the manufacture of "Flagg" steel castings and malleable iron castings.)

Seamless Tube Co., of America, Monessen, Pa. Built in 1904-5 and first put in operation in 1905; equipped with special machinery for rolling seamless steel tubes from billets.

Sharon Foundry Co., Sharon, Pa. Iron foundry built in 1903; one 20-gross-ton acid Laughlin open-hearth steel furnace and 2 Laughlin gas producers added in 1905; first steel made in December, 1905; product, gray iron and open-hearth steel castings; annual capacity, 12,000 tons of gray iron and 9,000 tons of steel castings.

Standard Roller Bearing Co., Forty-Eighth street and Girard avenue, Philadelphia. Works for the manufacture of iron and brass castings built in 1902; crucible steel-melting furnaces added in 1905; first crucible steel made December 14, 1905; 20 pots can be used at a heat; product, crucible steel machinery castings for the use of the company only; estimated annual capacity, 1,500 tons. Fuel, oil.

Sweet's Steel Co., Williamsport. Works at Newberry, near Williamsport, Pa. Built in 1903-4; ground broken in August, 1903; three 12-gross-ton Siemens basic open-hearth steel furnaces 5 gas producers, 5 heating furnaces, (one Siemens and 4 Sweet's,) 2 forge fires, 4 trains of rolls, (two 9 and two 13-inch,) and 3 hammers (one 200, one 1,000 and one 2,000-lb.); first steel made July 27, 1904, and first products rolled September 17, 1904; product, open-hearth ingots, special qualities of rolled and forged open-hearth steel, special shapes, and special analysis steel; annual capacity, 25,000 tons of ingots and 30,000 tons of rolled and forged products.

Brylgon Steel Casting Co., New Castle, Del. Built in 1903-4 and first steel made in September 22, 1904; two 2-gross-ton Bookwalter converters; product, steel castings; annual capacity, 3,000 tons. Two 5-gross-ton converters may be added. Fuel, coal, coke, and oil.

Follansbee Brothers Co., Liberty and Short streets, Second and Third avenues, Pittsburg, Pa. Works at Follansbee, West Va. Construction commenced in 1902; works completed in 1904; first products rolled September 6, 1904; 8 heating furnaces, 7 annealing funaces, 2 pickling machines, 4 sheet mills, (2 hot and 2 cold,) and 11 black plate mills (6 hot and 5 cold); product, sheets and black plates for tinning; annual capacity, 20,000 tons. Also makes tin and terne plates.

Watson Iron & Steel Co., lessee, Frick Building, Pittsburgh. Works at Paden City, W. Va. Built in 1903-5; 3 sheet furnaces, 3 pair furnaces, 2 annealing furnaces, and 5 trains of rolls (one 26 by 44-inch roughing and one 26 by 44-inch and two 26 by 38-inch sheet, all hot, and one 22 by 44 inch cold); product, steel sheets; annual capacity, from 6,000 to 7,000 tons. Fuel, natural gas. The works also contain 2 partly-erected Siemens open-hearth furnaces (one 20-gross-ton acid and one 25-gross-ton basic) upon which work has been indefinitely suspended. Owned by the Ohio Valley Steel & Foundry Co., of which Robert Miller, Pittsburgh, and the Security Trust Co., Wheeling, W. Va., are receivers.—Not operated to December, 1905.

Birmingham Steel & Iron Co., Birmingham, Ala. One 10-gross-ton basic open-hearth steel furnace built in 1904; first steel made October 1, 1904; product, general machinery castings; annual capacity, 6,000 tons. Fuel, producer gas. This company succeeds the Hood Ma-

chine Company and in addition to steel castings makes car wheels, forgings, etc.

Fort Worth Iron & Steel Mfg. Co., Fort Worth, Texas. Works at Dolard. Construction commenced in October, 1904; completed and put in operation April 25, 1905; one double and 2 single puddling furnaces, 3 busheling furnaces, 2 heating furnaces, and 2 trains of rolls (one 16-inch muck and one 10-inch guide with 5 stands); product, merchant bar iron; annual capacity, 7,500 tons.

Continental Steel Co., Cleveland. Works at Chagrin Falls, Ohio. One 4-pot crucible steel-melting furnace added to a former gray iron foundry in 1905; first steel made October 22, 1905; product, high-grade crucible steel, high-grade carbon steel, and steel castings. Fuel, oil and oil gas. Two additional 4-pot crucible steel-melting furnaces are to be built.

Dover Forge, The Dover Forge & Iron Co., Canal Dover, Ohio. Construction commenced in 1903; rolling mill put in operation October 13, 1904; 6 double puddling furnaces, 3 scrap furnaces, 2 direct-fired heating furnaces, one squeezer, and 2 stands of 22-inch 3-high bar rolls; product, iron forging billets, muck bar, scrap bar, iron sheet bars, and charcoal iron tinplate bars; annual capacity, 30,000 tons. Fuel, coal. A forge for the manufacture of charcoal blooms, slabs, and billets is connected with the works.

Sutton (The C. E.) Co., Toledo, Ohio. Works built in 1890; present company organized in 1904; 3 cupolas and two 2-gross-ton Tropenas steel converters added in 1905 and first blow made in June, 1905; product, general machine castings; annual capacity, 1,800 tons. Fuel, coke and oil. Also makes punches, shears, and forging machines.

Atlanta Rolling Mill & Tin Plate Co., Atlanta, Indiana. Construction commenced in 1903; completed in 1905; will probably be put in operation in March, 1906; 4 sheet and 4 pair furnaces, 2 annealing furnaces, and 8 black plate mills (two 32 and two 36-inch hot and four 34-inch cold); product, sheets and black plates for tinning; annual capacity, 14,000 tons. Fuel, manufactured gas.

Haskell & Barker Car Co., Michigan City, Indiana. Built in 1852; open-hearth furnaces added in 1890; 2 cupolas, 22 gas producers, 22 annealing furnaces, two 7-ton air furnaces, and five 15-gross-ton acid open-hearth steel furnaces; product, gray iron, malleable iron, and occasionally open-hearth steel castings; annual capacity, 9,000 tons of gray iron and 25,000 tons of malleable iron castings. Fuel, manufactured gas. Also builds railroad cars and makes car wheels.

Indiana Harbor Works, American Steel Foundries, Fisher Building, Chicago, Ill. Works at Indiana Harbor, Ind. Construction commenced in September, 1903; completed and put in operation in 1904; two 20-gross ton acid Siemens open-hearth steel furnaces; machinery, etc., of abandoned works at Fifty-ninth and Wallace streets, Chicago, used in part in equipping the plant; product, locomotive, car, and other steel castings; also cast steel car wheels; annual capacity, 30,000 tons. Fuel, oil.

Columbia Tool Steel Co., Chicago Heights, Illinois. Built in 1904-5; first crucible steel made May 9, 1905; first products rolled May 15, 1905; one Siemens-Martin 30-pot crucible steel-melting furnace with an annual capacity of 2,100 tons of ingots; 2 Swindell gas producers, 2 coal-fired heating furnaces, 4 reheating furnaces, 4 steam hammers, (750-lb., 1,400-lb., 3,500-lb., and 6,000-lb.,) and 2 trains of rolls (one 14-inch, with three 3-high and one 2-high stands, and one 9-inch, with four 3-high and two 2-high stands); product, rolled and hammered tool steel and crucible machinery steel; annual capacity, 2,000 tons. Fuel, bituminous coal and manufactured gas.

Missouri Malleable Iron Co., East St. Louis, Ill. Built in 1892; open-hearth steel furnace added in 1900; 2 cupolas, 12 gas producers, 23 annealing furnaces, 4 air furnaces, and one 18-gross-ton basic open-hearth steel furnace; product, malleable iron castings but steel casting could be made; annual capacity, from 18,000 to 20,000 tons. Fuel, coal.

Otis Elevator Co., 17 Battery place, New York. Chicago office, 9 Jackson Boulevard. Works at 550 West Fifteenth street, Chicago. Built in 1905 and first steel made in August, 1905; one 3-gross-ton Schwartz furnace; product steel castings; annual capacity, 500 tons. Fuel, oil.

Adrian Steel Casting Co., Adrian, Mich. Built in 1905; 6 crucible steel-melting furnaces; 24 pots can be used at a heat; first steel made July 20, 1905; product, steel castings; annual capacity, 1,000 tons. Fuel, oil.

Western Malleable Steel Co., Detroit, Mich. Built in 1905; one cupola, 4 annealing furnaces, and one special furnace; product gray iron and malleable steel castings; specialty, malleable steel castings for pneumatic tools, automobiles, gas engines, and all purposes where castings of a homogeneous and tough nature are required; first malleable steel casting made December 5, 1905; estimated annual capacity, 1,000 tons castings. Fuel used coal and coke.

Seattle Steel Co., Alaska Building, Seattle. Works at Youngstown, Washington. Built in 1904-5 and first put in operation May 6, 1905; 6 busheling furnaces, 5 heating furnaces, and three trains of rolls (one 9, one 12, and one 16-inch); the 9 and 16-inch trains were removed from the company's dismantled plant at Lakeview, Washington; product, bar iron, flats, rounds, squares, angles, channels, spikes, and 8, 12, 16, and 20-lb. tee rails; annual capacity, 15,000 tons. Fuel, coal and petroleum. A 22-inch mill may be added in 1906; also two 15-gross-ton-basis open-hearth steel furnaces.

Pig Iron and Scrap Bloomaries.

Carnahan Tin Plate & Sheet Co., Canton, Ohio. Forge added to a rolling mill in 1905; equipped with 6 knobbling fires and one charcoal refining fire; first blooms made in April, 1905; product, charcoal blooms made from charcoal pig iron and iron and steel scrap; annual capacity, 5,400 tons. Fuel, charcoal. Part of the blooms are consumed by the company in the manufacture of roofing plates and part are sold. Also makes black plates for tinning, tinplates, etc.

Dover Forge, The Dover Forge & Iron Co., Canal Dover, Ohio. Construction commenced in 1903; completed in 1904; first blooms made October 19, 1904; 6 knobbling fires and one 5,000-lb. steam hammer; product, charcoal blooms, slabs, and billets for the company's use and for sale. These are made from charcoal pig iron or scrap iron or steel; annual capacity, 7,500 tons. Fuel used charcoal.

Tinplate and Terne Plate Plant.

Follansbee Brothers Co., Liberty and Short streets, Second and Third avenues, Pittsburg, Pa. Works at Follanbee, W. Va. Construction commenced in 1903, works completed in 1904, using a part of the machinery formerly in the company's dismantled tin and tern plate plant at Allegheny City, Pa.; first tinplates and first terne plates made in September, 1904; 10 sets, 5 for tin plates and 5 for terne plates; weekly capacity, 3,000 boxes of tinplates and 3,000 boxes of terne plates. Fuel, natural gas. Makes black plates.

REPAIRING THE RAVAGES.

Much Work Must Be Done to Fit Ore Mines For Heavy Production of 1906.

In view of the probable heavy increase in ore shipments for 1906 and to remedy the ravages made by the business of 1905, extensive preparations are being gotten under way. Speculation is rife as to the producing limit of the mines now in operation and those of recent finds, with the idea of determining the ore output possible under extreme pressure.

The ravages of 1905 were tremendous. It is impossible to mine a million tons out of a pit that was not a shipper till this year, as in the case of the Morris mine, or to take out 1,800,000 tons from a comparatively small and quite deep pit, as at the Burt, or to take 2,500,000 tons from any pit, however large it may be, as at the Mountain Iron, without leaving gashes in the earth of very considerable size, and without making it necessary that there shall be tremendous works for a continuance of the operation. In the coming year it is proposed to make still larger shipments, and these must come from mines that have borne the brunt of the requirements of 1905. It is true that such mines as Fayal, Hull, Rust and Monroe, all of which were shippers far beneath their capacity in the past year, will be looked for to lead the procession, so far as increases are concerned, in 1906, but such standbys as Mountain Iron, Burt and others will be called on for a great tonnage. Some of the largest Mesabi mines have passed their zenith, and it is impossible that Stevenson, for instance, can ever again mine anywhere near the 1,652,000 tons it produced in 1904.

On the older ranges the larger mines hold out well. Chapin, Norrie, Lake Superior, Pewabic, Newport, Ashland, and many another, are good for as large a product, or in some cases far larger, for many years to come. Perhaps the most notable instances of increased tonnages in these old range mines during recent years have been those of Ashland and Newport, the former a year or two ago, the latter during 1905. Newport is now one of the leading mines of the Gogebic, and has developed immense ore bodies at deeper levels than any other Gogebic mine has yet reached. The fact is of the highest interest and importance in the consideration of the future of this range. If the main east pitching dykes of the Gogebic are as persistent at depth as that under the Newport's upper bodies, and carry such ore bodies, there is a future for the Gogebic such as has never been dreamed. Of the 46,000,000 tons that have been mined off that range practically all has been from above the 1,000-ft. level; indeed with the exception of the Newport, which is pumping from 2,000 feet, and some shafts at Ashland, Ironton and Colby that are down to 1,300 and 1,500 feet, there is not an underground pump in the district as deep as 1,100 feet. It is probable that these new Gogebic developments have been as important to the future of the Lake Superior country, in the way of reserves of high grade, standard, old range ores, as anything that has occurred for a long time. There have been finds on the Menominee range also, and it looks as though the coming year would see quite a large addition to its tonnage in sight. On the Marquette there have been some additional ore lenses discovered and opened, and the outlook is excellent.

Some Recent Ore Activities.

The Oliver Iron Mining Co. is erecting 22 houses for employees at Bovee, where it is opening the western Mesabi sandy ores. It is to put in a large washing plant at the Canisteo mine there this spring, and will carry out elaborate tests preliminary to the installation. The company has secured a half interest in the lands on the western Mesabi that belonged to T. B. Walker, of Minneapolis, for a sum above $100,000. There are several thousand acres of these lands, and a half interest has been owned by the Great Northern road for some time. Many of the lands are on the ore bearing formation, though little work has been done on them to this time. A few holes have been sunk by the Great Northern, and some of these have shown ore. The present sale is of the fee title to the lands, and carries no royalty payments.

The Duluth, Virginia & Rainy Lake railway, which now reaches north into immense timber tracts from the Mesabi range village of Virginia, has changed its name to Duluth, Rainy Lake & Winnipeg, and is to be extended to a direct connection with the Canadian northwest as soon as may be done. The road connects with the three iron ore lines at Virginia, and gets its southern outlet that way. The road has ordered steel for an extension to the Canadian boundary and a connection with the main line of the Canadian Northern, which is building a transcontinental road.

More than 400 men will be employed all winter along the Duluth & Iron Range in reducing grades near Highland and in completing the double track system of that road. This is the most extensive improvement that road proposes for the winter. Its traffic of 1904 was just about up to maximum, and if it is to carry much more ore during 1906 these betterments are imperatively demanded.

The Cleveland Cliffs Iron Co. is to open the Crosby mine, at Nashwauk, Mesabi range, and has let a contract for the stripping to the Roberts-Kingston Co., of Duluth. The amount is about $200,000. The company has also ordered an electric underground haulage plant from the General Electric Co. for the same mine and purposes to make it a vigorous shipper the coming year.

The Roberts-Kingston Co. has in hand stripping contracts amounting to about 2,000,000 yards, for completion the coming year or two. Most of this is at the Pillsbury and the Crosby mines.

A number of new and large stripping jobs are to be undertaken at Mesabi range points next spring. Most of these are at mines that have been opened underground, but where the advance in stripping methods has made deep openings possible.

Buffalo as Iron and Steel Center.—Henry J. Pierce, president of the Buffalo Chamber of Commerce and president of the International Traction Co., recently made the prediction that within five years Buffalo would stand next to Pittsburg as the greatest manufacturing center for iron and steel in the Uunited States.

"I think it may safely be said without contradiction," he explained, "that authorities in the iron and steel trade throughout the country agree that Buffalo is one of the best, if not the most desirable point in the United States at which to locate iron furnaces and plants for the manufacture of steel in its different forms. The products entering into the manufacture of iron and steel can be assembled at Buffalo most economically, the iron ore being freighted down the lakes, coke coming from western Pennsylvania, and limestone from within a few miles of the city. Over 1,000,000 tons of pig iron per annum are now produced in Buffalo and vicinity. Steel rails and other forms of iron and steel products are extensively manufactured and very large new iron works are to be built next spring. The prospect is that within five years Buffalo will be, next to Pittsburg, the greatest manufacturing center for iron and steel in the United States. There could be no better distributing center than Buffalo for finished products."

RAILWAY BUILDING OF 1905

Makes Heavy Advance Over Previous Year.—Equipment Orders Set New Record.

Both in increased trackage and in improved and new equipment, the railways of the country during the year just closed, recorded a substantial advance over 1904, quite in keeping with the progress in other lines of industry. The *Railway Age* has compiled statistics showing that during 1905 the new track laid in the United States, exclusive of the betterment of existing lines, aggregated 4,979 miles, a gain over the building of 1904 of about 700 miles. By far the greater part of this work was completed during the second half of the year; in fact on July 1 but 1,284 miles of track had been laid. In the months following, however, work was pursued with such vigor that the trackage of the year was almost 5,000 miles, distributed among 337 lines in 45 states and territories, and several hundred miles in addition is graded and ready for ties and rails.

The southwestern states, as in years past, by reason of their extent and their relative lack of railway facilities, led in trackage completed. However, they are close pressed by the northwestern states, to which district the scene of active railroad building is apparently shifting. By sections, the trackage completed was as follows: New England states 78.75 miles; Middle Atlantic states, 252.33 miles; South Atlantic states, 634.46 miles, Gulf and Mississippi Valley states 661.99 miles; Southwestern states, 1,106.26 miles; Central Northern states, 629.80 miles; Northwestern states, 991.88 miles; Pacific states, 622.82 miles. North Dakota was leading state with 525 miles, Texas second with 338 miles. It is estimated that close to $1,000,000.00 will be required for the completion of the work now under way or to be begun during 1906.

In the building of cars and locomotives 1905 made even a more striking advance over the previous year. The *Railway Gazette* estimated the number of freight cars built during the year at 165,455, against 60,806 in 1904, and passenger cars at 2,551 against 2,144 in 1904. Locomotives turned out during 1905 are placed at 5,491, a gain of 2,050 over 1904 and a number greater than the combined output of the years from 1895 to 1898 inclusive. These figures do not include cars or locomotives built by railroad companies at their own shops, nor do they include orders given for repairs or rebuilding.

Figuring the average cost of a freight car at $1,000 and of a passenger car at $7,000, the expenditure for cars alone during 195 was $183,312,000; estimating the average cost of a locomotive at $12,500, the total spent in that direction was $76,874,000. These totals give the aggregate expenditure for rolling stock and motive power during 1905 as $260,186,000.

The past few months have seen unprecedentedly heavy bookings for locomotives and cars, the majority of which are to be delivered during 1907. Care and locomotive building concerns have contracted for the 1906 capacity and in view of the comparative dullness of the early months of 1905, the record of the year just beginning is certain to be well above that of the one just closed in a whirl of activity.

Plans of Alex. W. Thompson.—Alexis W. Thompson, formerly president of the Republic Iron & Steel Co., is planning the erection of a blast furnace in the Birmingham district, if well-substantiated reports can be relied on. Mr. Thompson of late has frequently declared his great faith in the future of the iron and steel business of the south. His son, David Thompson, not long ago married a Birmingham lady, and is anxious to make that city his home. It is understood the son is to be manager of the furnace.

NEEDS OF THE SOUTH

And Its Great Possibilities Discussed by a Philadelphia Engineer—The Labor Problem.

David Baker, a well known metallurgical engineer of Philadelphia, has recently made a thorough examination of conditions in the Birmingham industrial field. The results of his labors, particularly as showing the needs of the southern iron and steel industry, are presented in a recent interview in the *Birmingham Age Herald.*

"The early plants established in the Birmingham district," said Mr. Baker, "were exceedingly flimsy. The blast furnace plants, so far as I have examined, had, and still have, less than one-half the amount of metal weight requisite for a modern plant.

"The Tennessee company has recently built a thoroughly modern furnace in its No. 6 stack at Ensley. This furnace is in excellent shape. It is the only furnace that I have inspected in the district that is satisfactory in all its details. The results obtained from this No. 6 furnace justify the expenditure of the money made to bring it up to its present state of perfection. All furnace companies in the south ought to put in plants similar to the Tennessee's No. 6 and thereby have the best equipment.

Important Methods and Apparatus.

"If manufacturing and industrial interests get control of the raw material deposits in the district, Birmingham will leap forward. The district has suffered from speculative desire and spectulative experiments on the part of operators. What is needed now is improved mining methods and up-to-date mining apparatus.

"If these methods and apparatus are put in and used, operators' profits in the Birmingham district will increase from $1.50 to $2 a ton in mining and smelting. There would also be an enormous saving in fuel consumption by putting in modern stacks and modern equipment. Since many of the furnaces here were built, great progress has been made in the blast furnace process, and in smelting the pig iron from the iron ores. The Birmingham district has not taken advantage of these new and improved processes.

"If Birmingham is to be made a big iron district, persons interested in the district's development should arrange to tap the Warrior river with a canal and bring water in large quantities down by the force of gravity to Birmingham. You can't have a big iron district here without a large supply of water. The rivers of Pittsburg have been invaluable to that iron center. They have been as great a factor in its development as the railroads.

"The possibilities of the district have hardly been scratched—provided you get plenty of water. Next to the lake region Birmingham is the greatest iron ore center on the continent. The lake ore is steadily getting leaner. Birmingham is comparatively a virgin field. Under proper development the Birmingham district will be most helpful in perpetuating the iron industry in the United States.

"The labor problem here has its difficulties. The hope is in the introduction of foreigners. Immigration should be encouraged through the southern ports. Finns, Austrians and Italians will be especially valuable in the development of this district. Care needs only to be taken that the immigrants be selected from the laboring class and not from the criminal or pauper element. The Birmingham district is now emphatically short of labor.

Consul Mowrer of Ghent writes that the use of motor boats is increasing in Belgium and that those of American make are given favor.

EXTENSIVE TOUR

ARRANGED FOR SENIOR ENGINEERS OF UNIVERSITY OF ILLINOIS.

Wisconsin Plans Series of Lectures by Experts.—News of Technical Colleges.

The university of Illinois has issued a bulletin and program of the annual inspection trip of the senior class of the engineering department. The program provided for visiting a large number of plants in Chicago and Milwaukee, among them the Illinois Steel Co., John Mohr & Son, Pullman Co., South Side Elevated Railway power plant, Fourteenth Street Pumping Station, Allis-Chalmers Co., Falk Co., Power and Mining Co., National Electric Co., Milwaukee Electric Light & Power Co., Nordberg Engineering Co., Crane Co., Deering Harvester Co., Union Drop Forge Co., Northwestern Elevated Railway power plant, Peoples Gas Plant and the Chicago Edison Co. A number of other power plants and places of interest will be included in the itinerary. In connection with the visits each student is required to submit a written report to Prof.Breckenridge, who is in charge of the party, on the following items:

1. Name and location of plant.
   Character of output.
   State the advantages and disadvantages of the location of this plant.
   How many men are employed?
   What environment does this plant afford the workman?
   What is the basis of wages paid?
   State methods of attaining practical ends, both in machine output and methods of handling material by special devices.
2. What special features in machine design are offered in this plant?
3. How is power distributed?
   What is the total horsepower of boilers? of engines?
   What is the average power developed and for how long?
   Kind of boilers, furnaces, engines, condensers, generators, etc.
   Kind and quality of coal burned and how handled?
   How many men employed in the power department?
   Is the power plant a modern and economical one?

University of Wisconsin Lectures.

A series of twelve lectures by prominent engineers has been arranged as usual, for the students of the college of engineering, of the University of Wisconsin. This year most of these talks will be devoted to subjects related to chemical engineering, a new course which has just been established. The first lecture in this course was given by Mr. Fred B. Wheeler formerly of the Binghamton Gas Works, and now associated with the Semet-Solvay company, for whom he has recently installed a large by-product coke plant in Milwaukee. His subject was "A Survey of the Present Aspect of Gas Engineering." At the close of his talk Mr. Wheeler announced that he would offer a prize of fifty dollars for the best thesis written by a member of the senior class of the college of engineering on some subject relative to the gas industry. The second lecture of the course will be by J. A. Faithorn, president of the Chicago Terminal railroad, who will speak on "Railroad Rate Legislation."

Mr. Judson C. Dickerman, a graduate of the Massachusetts Institute of Technology, and recently superintendent of the Merrimac Chemical Co., of Boston, has been appointed assistant professor of chemical engineering in the college of engineering of the University of Wisconsin.

The college of engineering of the University of Wisconsin thus far this year has 771 students. Of this number 7 are graduate students, there are 136 in the civil engineering course, 95 in the mechanical engineering, 163 electrical engineering, 51 general engineering, and 17 in the new chemical engineering course. The freshman class numbers 278. The total enrollment of the University of Wisconsin this year will exceed 3,600.

The new chemistry building which has been in the course of construction during the past year, has just been completed and is now ready for occupancy. The building is completely equipped with apparatus for the study of all branches of the subject, including electrical, physical and pharmaceutical chemistry. The auditorium on the main floor will accommodate between 500 and 600 students, and the laboratory for general chemistry which adjoins it has 540 individual working desks. Smaller research laboratories for graduate and advanced students, a laboratory for inorganic chemistry, and the offices of the professors of the department, occupy the remainder of the first floor. Two large laboratories for analytical chemistry, the department library and two lecture rooms constitute the second floor. On the third floor are located the laboratories for pharmaceutical, physical, and electrical chemistry, and the office and laboratory of the state chemist.

Worcester Polytechnic Institute.

Some trouble has been experienced in the Institute foundry this fall because of a strike which was declared by the moulder's union about three months ago. The shop has now been declared by the Institute authorities to be an open shop, and in the future it will be run on that basis. Since the strike was declared, more or less trouble in securing competent help has, of course, been experienced, but the foundry is now in comparatively good shape, and is turning out its normal product one more.

The Locke Insulator Co., of Victor, N. Y., has just presented to the electrical department, a sample of one of their very large types of high tension insulators; and The Washburn Shop has recently received from the Warner Instrument company, of Beloit, Wis., a cut-meter, a device for showing the surface speed of work which is being turned or cut. It consists of a miniature dynamo, the voltage of which is measured by a volt meter enclosed in the same case. By an ingenious arrangement the instrument reads directly in feet per minute instead of in volts. The whole machine is so compact that it is contained in a case no larger than a good size watch. It weighs only a few ounces. It will be used chiefly in connection with student work.

A large order for wet drill grinders has just been received from England, which calls for machines like those which took the highest award at the Buffalo and also at the St. Louis exposition. The foreign orders for both drill grinders and sensitive drills have been greater this fall than ever before.

The members of the junior class in mechanical engineering are gradually replacing the spindles of the lathes in the pattern department, with new spindles made of harder steel. All the work in the production of these spindles is done by the students themselves as a part of their regular machine shop instruction.

George Washington University.

A new organization of the work in engineering at the George Washington University is taking place. By a provision of an amendment to its charter made by act of Congress in March, 1905, there may be organized with the consent of

the University, colleges for the purpose of carrying on special lines of eductional work. These colleges, while legally independent in some ways, are closely connected with the university, and their deans and members of the faculties are members of the educational councils of the university. The system is similar to that of Oxford with modifications.

Under the provisions of this act there has just been filed with the recorder of deeds, of the District of Columbia the charter of the Washington College of Engineering. According to the terms of the charter, the head of the college shall be a dean, and the particular studies to be taught are civil, electrical, mechanical, mining, and ordnance engineering; naval architecture; mathematics, pure and applied; sciences, natural and physical; modern languages; and such other branches as are or may be taught in colleges of engineering and technology.

The first board of trustees consists of Gen. John M. Wilson, U. S. A. (retired), formerly chief of engineers, U. S. A., Admiral Charles W. Rae, engineer in chief U. S. Navy Bernard R. Green, superintendent of the library of Congress. Charles D. Walcott, director U. S. geological survey, Otto H. Tittman, superintendent U. S. coast and geodetic survey, T. Commerford Martin, of New York, and John Joy Edson, John B. Larner and Thomas M. Chatard, of Washington.

THE PROGRESS OF SHIPBUILDING.

Events of the past few months, and more particularly during the past few weeks, have brought out more strongly than ever before the fact that ore producing and ore consuming companies realize that economy in transportation is the leading feature of their interests and that raw material delivered at furnaces and manufacturing plants at the lowest possible cost is the leading consideration in the low cost of manufacture.

Within a very short time several of the large producers and consumers of ore have gone into the vessel owning business. The United States Steel Corporation, when it was organized in 1900, secured, through acquiring the vessels now controlled by the Pittsburg Steamship Co., the largest fleet on the great lakes. Since that time it has built several new boats, all of the most modern type, the two latest having a carrying capacity of about 14,000 tons on a single trip from Lake Superior ports to Lake Erie or South Chicago, or from the mines at Escanaba to receiving ports. Realizing that economy lies in the transportation of large cargoes at a minimum cost of steamship operation, the Pittsburg Steamship Co. last season sold twenty of its smaller vessels to parties on the Atlantic coast and immediately afterwards contracted for the construction of four steamers 569 feet long, over all, 549 feet keel, 56 feet beam and 31 feet depth. Within the past three months the same company has closed contracts for four steamers 600 feet long, over all.

Other ore consuming companies have been in the steamboat business of the lakes for many years, but quite recently new interests have appeared, and the Jones & Laughlin Steel Co. contracted with the Great Lakes Engineering Co., for two 10,000 ton carriers, the Cambria Steel Co., has closed for two carriers of the largest type, probably duplicates of the 600-foot corporation steamers, and W. H. Becker, of Cleveland, representing Pittsburg capitalists having blast furnace interests has closed for two boats. The Cleveland-Cliffs Iron Co., of Cleveland, large ore producer with a fair sized fleet already on the lakes, has closed for three boats within the past year, and the Shenango Furnace Co., of Pittsburg, has closed for one boat, and will order two more.

It has been estimated that during the season of navigation of 1906, the steel corporation will ship 20,000,000 tons of ore from its mines. Its fleet has a capacity of close to 12,000,000 tons in a season, this leaving about 8,000,000 ton of its ore to be carried by outside tonnage on the lakes, while other interests will bring down 14,000,000 to 18,000,000 tons.

The shipyards of the lakes have orders at this time far in excess to those of any other year. The American Ship Building Co., has contracts for the construction of 31 lake freighters, the Great Lakes Engineering Works has contracts for eight and the Toledo Shipbuilding Co., recently reorganized with new capital, will build a freight and a passenger steamer.

GREAT RECORD.

Made in the Coke Industry—All Available Ovens In Blast —The Washing System.

The year that has just passed and gone is one that goes down in the annals of the Connellsville coke region without a superior. Never before has there been experienced such an activity and era of good prices. The astonishing production of last year aggregates about 12,000,000 tons. Approximately 4 percent of this tonnage went to furnaces and foundries in the east, and the remaining 96 percent to furnaces and foundries in the west.

All the available ovens in the region are producing coke, working six days a week, and out of the thirty-three thousand ovens in the Connellsville region only 900 are out of blast. About 300 of these ovens belong to the H. C. Frick Coke Co., and will be fired within a few days, while the remainder are ovens owned by the Bessemer Coke Co., W. J. Rainey and others, where the coal has been worked out.

Today finds 6,000 more ovens in course of construction and with the present favorable weather these will be ready to be fired by Feb. 1.

Prices at the present time for furnace coke hover about the three dollar mark although some contracts have been taken for the first half of next year at a somewhat less figure. Foundry coke is bringing $3.65 and soft coke for core ovens and salamanders is quoted at $2.25, but there is very little of this coke to be had at the present time. High sulphur furnace coke for heating purposes is being sold at $2.50.

Never before in the history of the coke business have the prospects been as bright for a new year as the operators find them today, and it is quite certain that there will be a good demand for coke and at favorable prices for next year.

Notwithstanding the fact that during this season of the year under average conditions, the railroad people are handicapped for coke cars, today there seems to be an ample supply of B. & O., P. & L. E., and Pa. R. R. coke cars; they seem to have just about enough coke cars to take care of the requirements of the operators. As box cars for foundry coke have not been as plentiful as they might have been, some of the larger foundries have been forced to take foundry coke in open-top cars.

A Pittsburg firm has booked an order for one hundred cars of coke for shipment to a smelter of the Green Consolidated Copper Co., Cananea Senora, Mexico.

The shipments for last week are far from being on the decline, as there was a weekly output of 375,000 tons.

The furnaces and foundries in the year 1906 will be using a great deal of coke made from washed coal. The Southern-Connellsville Coke Co., of Uniontown, has a washer, which is about ready to be put in operation with a daily capacity of 1,800 tons. The Sunshine Coal & Coke Co. also has a smaller washer in operation and expects to fire 100 additional ovens next week. The McKeefrey Coal Co. has one which will be put in operation in the early spring and the Bessemer Coke Co. and the Keystone Coal & Coke Co. are also using washers.

Iron Trade Chronology for 1905.

JANUARY.

1. Year opened with last large sales of Bessemer at $15.50, valley, but $16.00 being quoted, other prices, at Pittsburg, being: billets, $22.00; merchant steel bars, 1.40c; plates and shapes, 1.50c; sheets, 2.30c; tin plates $3.55; wire nails, $1.75. Total pig iron production of country, with Allegheny and Neville Island furnaces of American Steel & Wire Company blown in at beginning of month, at the rate of fully 20,200,000 gross tons per annum.

3. Official discounts on merchant pipe advanced one-half point, making consumers' carloads 76½ off on ¾ to 6-inch black steel pipe.

3. It develops that Carnegie Steel Co. has bought 2,000 tons heavy melting scrap Munhall delivery at $16.50, following purchases of 5,000 tons in December at same price for Sharon delivery.

10. Steel corporation buys 25,000 tons Bessemer pig iron from W. P. Snyder & Company at $15.50, valley, for January delivery, this including 6,500 tons of unshipped December iron. Bessemer Furnace Association had refused to shade $16.00, which was regular asking price. It met and discussed this transaction, and continued to quote $16.00.

10. Chain Association meets in Pittsburg and advances prices about $2.00 per ton, following a like advance on December 22.

25. Lackawanna Steel Co. exchanges 15,000 tons melting scrap with merchant firm for 15,000 tons Bessemer pig iron, scrap being then sold to steel corporation for consumption at Newburgh. This makes a total of 38,000 tons of a scrap accumulation disposed of by Lackawanna.

FEBRUARY.

1. Wire products advanced $1.00 per ton, to $1.60 for nails and 1.45c for plain wire.

1. Official price on merchant pipe increased one-half point.

6. Having started the two Donora blast furnaces in January, Carnegie Steel Co. this week starts portion of the open-hearth steel plant.

7. Steel corporation purchases 25,000 tons of Bessemer pig iron for February at $15.50, valley. Bessemer Furnace Association, having receded from its position of demanding $16.00, gets 15,000 tons of the business.

9. Advances of $2.00 per ton on galvanized sheets, $1.00 per ton on blue annealed sheets and 10 cents per square on galvanized corrugated roofing.

15. Heavy movement in southern pig iron during past week, totaling 100,000 tons, chiefly at $13.50, Birmingham.

16. Structural shapes advanced $2.00 per ton to 1.60c.

16. Plates advanced $2.00 per ton to 1.60c for plates over 14 inches and 1.50c for narrower plates.

21. Steel corporation buys 40,000 tons of Bessemer pig iron ostensibly for March, 5,000 tons to be anticipated, 25,000 tons from Bessemer Furnace Association and 15,000 tons from W. P. Snyder & Co., at $15.50, valley. One of the sellers makes deliveries largely out of speculative iron lately picked up at $15.10 to $15.25.

22. Slight break in foundry pig iron at Pittsburg, one consumer buying 10,000 tons at $15.75, valley, against $16.00 maintained since the slight weakness in the middle of January. Same purchaser took Alabama and Virginia iron at full prices.

28. Steel bar manufacturers meet in Pittsburg and advance prices $2.00 a ton to 1.50c for Bessemer and open-hearth.

MARCH.

1. Official price of merchant pipe advanced one-half point, making third half-point advance this year, following advances of one point each on first of October and November. The later advances were not held.

1. Connellsville coke workers' wages advanced about 9 percent, mining and loading room and rib coal being advanced from $1.10 to $1.20. A few jobs advanced only about 6 percent, and one or two advanced 11 percent.

1. Car builders are understood to have on books orders for 20,000 all-steel and 60,000 wooden and steel underframed cars.

6. Lake ore rates fixed for season at 75 cents from head of lakes, 70 cents from Marquette and 65 cents from Escanaba.

16. Sheet advances as follows: $2.00 per ton on black sheets and Wood's refined; $1.00 on blue annealed sheets, and 10 cents per square on painted corrugated roofing making, with the advances of February 9, a straight advance of $2.00 per ton on all flat sheets and 10 cents per square on corrugated roofing, to 2.40c on black sheets, 3.45c on galvanized, 2.70c on Wood's refined, $1.75 on painted corrugated roofing and $2.95 on galvanized corrugated roofing. These advances were not held for long, the official prices being shaded.

17. Steel hoops advanced $2.00 per ton to 1.65c.

18. Pittsburg Steel Co. buys 11,000 tons monthly, August to June inclusive of open-hearth billets from Carnegie Steel Co. and 6,000 tons monthly, July to June inclusive, from Republic Iron & Steel Co., making a total of 193,000 tons. These contracts to follow contracts expiring with Republic and La Belle, totaling about 11,000 tons monthly, the increase in tonnage being partly to take care of the Seamless Tube Co. of America, an allied interest. The price was not stated, but assumed to have been between the official price of $21.00 and the ruling price of $23.00, guaranteed against decline. Some negotiations had been conducted looking to a purchase of Bessemer pig iron to apply on a conversion deal.

20. Cambria Steel Co. buys 35,000 tons of Bessemer and basic pig, chiefly second quarter. Youngstown Iron Sheet & Tube Co. buys 25,000 tons of Bessemer for second half, to apply on its conversion deal for slabs and skelp with Republic Iron & Steel Co. These sales made at the current market price of $15.50, valley, and are immediately followed by sales of about 25,000 tons to various other interests at the same price, making about 85,000 tons sold in a few days.

31. American Sheet & Tin Plate Co. has this month made approximately 50,000 gross tons each of sheets and tin plates, breaking all its records.

APRIL.

1. Steel corporation makes wage advances ranging from 5 to 9 percent to other than tonnage and salaried men, the advances affecting about 50,000 employes.

3. Steel corporation buys about this time 33,000 tons of Bessemer pig, 22,000 tons from Bessemer Furnace Association at $15.50, valley, 2,000 tons from an independent interest at $15.40, valley, and 9,000 tons from the Hanging Rock district, the price on this last named being f. o. b. and equalizing freights to Cleveland with the valleys, whereas the iron was shipped to Wheeling, on which the purchaser saved 10 cents freight.

21. Official price merchant pipe advanced one-half point, making discount 75 for consumers' carloads, black steel pipe, ¾ to 6-inch. Actual market was already below the official price, and still declining.

21. Cotton tie price for season fixed at 85 cents, against 75 cents for previous season, which had later been advanced to 85 cents.

22. United States Steel Corporation signs contract for

purchase of Hecla Coke Co., covering 1,072 ovens and 1,500 acres of best Connellsville coking coal.

30. Sales of billets this month have been the largest for many months, excluding the special sales to Pittsburg Steel Co. in March, and have totaled nearly 100,000 tons, being largely for delivery in second half.

MAY.

1. Valley blast furnace labor advanced 10 per cent.

1. About half the steel corporation's April iron is undelivered, corporation having agreed not to cancel any unshipped portion, so that purchase for May is unnecessary. No further purchases by corporation until fall.

2. Annual convention Amalgamated Association at Detroit.

3. Deliveries of Mabel furnace on Pennsylvania tunnel order, taken at not over $12.00 for a special grade of iron, completed, and the furnace turned over to Shenango Furnace Co., which had bought it last fall.

4. Cambria Steel Co. buys 40,000 tons Bessemer pig for May, June and July, subject to monthly price adjustment, market being nominally $15.50, but weak, foundry iron having lately declined 25 cents and southern iron 50 cents.

5. The sheet market has continued to weaken, and $2.00 under the official price of 2.40c can now be done.

11. Meeting of wire interests at Chicago discussed the current shading of $1.00 a ton from official prices.

JUNE.

7. In past fortnight southern iron has dropped $1.00 to $12.00.

9. Iron wage scale settled between Republic Iron & Steel Co. and Amalgamated Association, a few slight advances being made.

19. Rail orders have been very heavy in past few weeks, railroads which had covered for their prospective needs for entire season coming in for additional tonnages, and announcement now made that Carnegie Steel Co. will put Ohio works at Youngstown on rails July 1, this mill not having rolled rails for more than a year.

27. Pittsburg Steel Co. makes five-year contract with Carnegie Steel Co. for about a million tons of Bessemer and open-hearth billets a year, a very advantageous contract to both parties, the buyer getting the steel at a low price and the seller being assured of the dropping of plans for the building of a new steel plant. The contract supplants the contracts of March 18 which have not yet come into operation.

JULY.

3. Amalgamated Association and American Sheet & Tin Plate Co. agree on wage scales, every vestige of an output limit being stricken out, with concession of some minor points. Most important change in wage scale for many years.

8. Low point on southern iron, $11.00 being done at Birmingham, also at some points taking 25 cents less freight.

15. Sales of 75,000 tons of southern iron made in week closing to-day, and most sellers have advanced to $11.50, a few quotations being still out at $11.00.

AUGUST.

1. Open market on merchant pipe has declined one point in addition to the point early in July, making discount to jobbers 80 on ¾ to 6-inch, or four points more than the official price.

3. Meeting of wire mills held at Chicago; the mills bind themselves to adhere strictly to the official prices, based on $1.80 for nails, but shading to $1.70 soon occurs.

5. American Sheet & Tin Plate Co. makes offer, good for 60 days, of 15 cents special rebate on contracts at ruling official price, in order to induce specifying.

23. Sales of three moderate sized lots of Bessemer pig establish the market at $14.50, valley, against $14.00 ruling at beginning of month.

24. Rail mills open order books for 1906 tonnage; more than 150,000 tons sold within a week.

29. Steel corporation buys 25,000 tons of Bessemer pig for first half September, at $14.50 for 10,000 tons and $15.00 for 15,000 tons.

31. Structural shapes suddenly advanced $2.00 per ton to 1.70c, the highest official price in more than six years.

SEPTEMBER.

5. Carnegie Steel Co. withdraws from market as seller of billets and sheet bars.

7. Light rails advanced by steel producers $1.00 per ton, following an advance in August, making price $26.00 for 25 to 45-pound sections.

12. An advance of $1.00 per ton made in wire products to $1.75 for nails, previous official price having been $1.80, but regularly shaded $2.00 per ton.

15. Hoops advanced $2.00 per ton to 1.60c.

16. Steel Corporation buys from Bessemer Furnace Association 10,000 tons of Bessemer pig at $15.00 for late September delivery.

20. Price of October sheet bars on monthly adjustment contracts announced at $26.00, against $25.00 for September.

26. Steel Corporation buys a total of 40,000 tons of Bessemer pig from three interests at $15.00 for October delivery.

31. Demand for merchant pipe has been much better during past fortnight, independents rapidly filling up, but prices remain close to bottom, market not being over 80 off to jobbers on ¾ to 6-inch.

OCTOBER.

1. Strictly Connellsville furnace coke is $2.50 for prompt shipment an advance of 50 cents in the fortnight. On contract for 1906 price has also advanced to $2.50, large contracts having been made.

2. Leading interest reduces its official prices four points, to 80 off to jobbers on ¾ to 6-inch.

2. American Sheet & Tin Plate Co. makes new official price of $3.30, with usual 5-cent rebate, being reduction of 10 cents from price as established by the 15-cent special rebate offered Aug. 5.

2. Wire products advanced another dollar a ton, to $1.80 for nails.

7. Sloss-Sheffield Steel & Iron Co. announces that it has sold 50,000 tons at $13.00, Birmingham, presumably for 1906 deliveries, and will book no more at that figure. On 1905 delivery, $12.50 can still be done.

14. Various concessions on sheets have been withdrawn in past fortnight, and the market is firm at 2.20c for black and 3.25c for galvanized, No. 28 gauge, in large lots.

16. Ferro-manganese has advanced to $60 for any delivery guaranteed before Dec. 1.

17. Steel Corporation buys 20,000 tons Bessemer pig for late October delivery at $15.50 and 20,000 tons for November at $16.00.

17. Strictly Connellsville furnace coke is now quoted at $3.00 on contract, and 72-hour foundry at $3.50, spot lots being at slightly higher figures. Considerable tonnage has been contracted on the advance from $2.50, and it develops now that consumers are fairly well covered.

31. Steel Corporation buys 25,000 tons of Bessemer pig from the Bessemer Furnace Association and 20,000 tons

from W. P. Snyder & Co., at $16.50, for November and December delivery.

31. One large and several minor ore firms have been selling Lake Superior ores for next season at a 25-cent advance over this season, other interests holding out for a 50-cent advance.

NOVEMBER.

13. Small lots of ferro-manganese for delivery guaranteed this year have been sold at $75.

18. A carload of prompt and a carload of December ferro-manganese sell today at $90.

20. American Sheet & Tin Plate Co., effective today, makes following advances: sheets, $2.00 per ton to 2.30c for black and 3.35c for galvanized, No. 28 gauge; tin plates, 10 cents per box to $3.40, less 5-cent rebate, for 100-pound cokes.

20. The ore firms which were selling at a 25-cent advance over this season are now sold up, and the market is in hands of other sellers who held out for 50-cent advance.

24. A carload of ferro-manganese sells at $125.

24. Republic Iron & Steel Co., announces that its minimum price on iron bars is advanced $3.00 a ton to 2c f. o. b. mill.

27. Hoops advanced $2.00 a ton to 1.85c.

DECEMBER.

1. Following two sales of large tonnages of muck bar at $29.50 and $30.00, Pittsburg, a sale of a round tonnage for delivery over first half of 1906 has been made at $32.00, delivered Pittsburg.

7. Sales of 100,000 tons of Bessemer pig have been made in the past week, including 69,000 tons for first half, subject to monthly price adjustment, 25,000 tons for second half at 17.00, valley, to a western interest, and various smaller lots for first half at $17.50.

20. Plate mill meeting in New York again decides not to advance prices.

GENERAL INCREASES

Shown In Output of Metalliferous Mines of Ontario.—Fines For Price-Raising.

(Special Correspondence.)

TORONTO, CAN., Dec. 26.—Returns received by the Ontario Bureau of Mines shows that the output of the metalliferous mines and works of Ontario during the nine months ending September 30, was of a total value of about $9,000,000. In this estimate allowance is made for the conversion of pig iron into steel. For the whole of 1904, the metallic production was $5,061,677, so that the rate of production for the present year is about double. The principal cause of the increase is the yield of the silver-cobalt mines, but the items of iron ore, pig iron and steel, the latter two especially showing a satisfactory increase. The output of iron ore during the first nine months of 1905 was 167,045 tons, value $157,640—a very considerable increase over 1904 though a comparison might be misleading, as for some months in that year the Helen mine was closed down. The output of pig iron was 187,797 tons, value $2,907,864 and of steel 101,176 tons, value $2,421,549. The production of these items in 1904 was—pig iron 127,845 tons, value $1,811,664; steel, 51,002 tons, value $1,188,349.

J. H. Plummer, president of the Dominion Iron & Steel Co., before sailing for Europe stated that the affairs of the company were in a most satisfactory condition. The output of pig iron converted into steel was 20,000 tons per month, and he expected that by spring it would be increased to 25,000 tons per month. It has been decided to install a plant to de-siliconize the pig iron before it is taken to the hearth furnaces.

The Collingwood Shipbuilding Co. has obtained a contract from James Playfair of Midland, Ont., to build a steel cargo steamer 486 feet in length by 55 feet beam and 32 feet deep with a carrying capacity of 320,000 bushels of wheat, to be built on the arch-deck system and of extra strength. The same company also has a contract with the Montreal Transportation Co. for a steel tow barge 206 feet long, 41 feet beam and 19 feet deep with complete water bottom especially designed for the St. Lawrence trade. The value of the two contracts is approximately $400,000.

BAR IRON WAGE ADJUSTMENTS.

The following table shows the results of the bi-monthly examinations into prices of shipments of common iron bars during the past four years, the first columns showing the published average for the bi-monthly period expressed, the actual average lying somewhere between the expressed price and the next tenth above, the following columns showing the actual rate paid for puddling during the same two months, based on the ascertained average in the previous two months. The prices taken are base prices, f. o. b. mill, Youngstown and Cleveland:

	Average price of shipments in bi-monthly period.				Puddling rate during same period.			
	1902.	1903.	1904.	1905.	1902.	1903.	1904.	1905.
Jan.-Feb.	1.5c	1.7c	1.3c	1.4c	$5.75	$6.12½	$5.25	$4.90
Mar.-Apr.	1.5c	1.7c	1.3c	1.5c	$5.75	$6.12½	$5.25	$5.12½
May-June	1.6c	1.7c	1.3c	1.4c	$5.75	$6.12½	$5.25	$5.37½
July-Aug.	1.6c	1.6c	1.2c	1.4c	$6.00	$6.25	$5.25*	$5.50
Sept.-Oct.	1.6c	1.5c	1.2c	1.4c	$6.00	$6.00	$4.90	$5.50
Nov.-Dec.	1.7c	1.3c	1.3c	....	$6.00	$5.75	$4.90	$5.50

*1903-4 scale in force; new scale agreed to September 11.

PUDDLING WAGE SCALES.

Average price bar iron.	1901-2	1902-3	1903-4	1904-5	1905-6
1.0c	$5.00	$5.00	$5.00	$4.90	$5.00
1.1c	5.00	5.00	5.00	4.90	5.00
1.2c	5.00	5.00	5.00	4.90	5.00
1.3c	5.25	5.25	5.25	4.90	5.25
1.4c	5.50	5.50	5.50	5.12½	5.50
1.5c	5.75	5.75	5.75	5.37½	5.75
1.6c	6.00	6.00	6.00	5.62½	6.00
1.7c	6.12½	6.12½	6.25	5.87½	6.25
1.8c	6.25	6.25	6.50	6.12½	6.50
1.9c	6.37½	6.37½	6.75	6.37½	6.75
2.0c	6.50	6.50	7.00	6.62½	7.00

Bonus to Employes:—Wyckoff, Seamans & Benedict, Ilion, N. Y., manufacturers of the Remington typewriter, recently made their semi-annual bonus distribution. John Calder, manager, divided $12,250 in gold among the 245 employes selected at that time, the list including those who had been at least ten years in the continuous employment of the company and had maintained good standing and high efficiency. There were three 30-year men, three 25-year men, 28 20-year men, 103 15-year men and 108 10-year men. Prizes and framed certificates for good suggestions from employes adopted during the last six months were also distributed.

The differences between the polishers and the Wehrle stove foundry at Newark, O., have been adjusted and the strike of several months' duration is over. Three murders were committed during that time. On Dec. 29, three of the strikers were held to the grand jury without bond to answer the charge of killing a non-union workman. Five other strikers are also under indictment.

CINCINNATI HEAVY PATTERN GANG DRILL.

In the accompanying illustration is shown a special arrangement of 21 inch drills arranged as a gang drill. This machine is manufactured by the Cincinnati Machine Tool Co., Cincinnati.

The machine consists essentially of four heavy pattern 21 inch drills, mounted together on a single base casting provided with an extension base for an electric motor.

The drills are driven from the motor, through a shaft which extends along the base, and which is geared to each drill by mitre gears. If desired, the motor drive can be eliminated and any other method of driving suited to the requirements of the shop in which the machine is to be used can be substituted.

The first three machines of the gang are provided with power and hand feed, the latter being by means of either wheel or lever. The fourth machine is equipped with a patented geared tapping attachment.

The tables of the drills are square, and are provided with oil grooves, which are raised and lowered from the front of the machine, instead of from the back as is usually the case. The complete machine is provided with oil piping and a pump for conveying lubricant directly to the drills.

The arrangement of the drills as shown in the illustration can be considerably modified. They can be furnished with or without the tapping attachment, with or without

CINCINNATI HEAVY PATTERN GANG DRILL.

back gears, or without power feed. Square or round tables can be used, or a special continuous table can be furnished.

A PNEUMATIC GRINDING AND POLISHING MACHINE.

The Independent Pneumatic Tool Co. of Chicago and New York has just placed on the market a new air machine, designed as the "Thor" pneumatic grinder No.7, designed for grinding, polishing and buffing purposes, which is shown in the accompanying illustration.

Heretofore no air machine has been altogether successful on the class of work mentioned. The machine is of the reciprocating piston type, having four pistons, and direct valve motion, which gives it high power, and a speed of approximately 3,000 revolutions per minute.

The grinding spindle proper is held in a housing extended from the end of the motor in line with the crank shaft. It is not a part of the crank shaft, however, but connected with the same. The grinding spindle itself runs on bearings that are a combination of ball and plane bearings. There is a large bronze bearing next to the motor, and then a four-point ball bearing which acts as a thrust bearing both ways, and also as a support for the shaft. At the outer end is a metallic packing that also acts as a bearing, and at the same time prevents the lubricating oil from running out of the machine.

The motor and shaft run in a bath of oil, and the peculiar bearings for the grinding spindle make it possible

"THOR" PNEUMATIC GRINDING AND POLISHING MACHINE.

for this to run at a high speed without getting hot or losing its lubricant. A grip-handle in line with the grinding spindle, and the outside of the housing of same spindle, serve as handles. Mandrels of any suitable length or shape may be attached to the grinding spindle for driving emery wheels, soft polishing wheels, or discs. The machine weighs about twenty pounds, consumes approximately twenty cubic feet of free air per minute, and is very easily handled and operated.

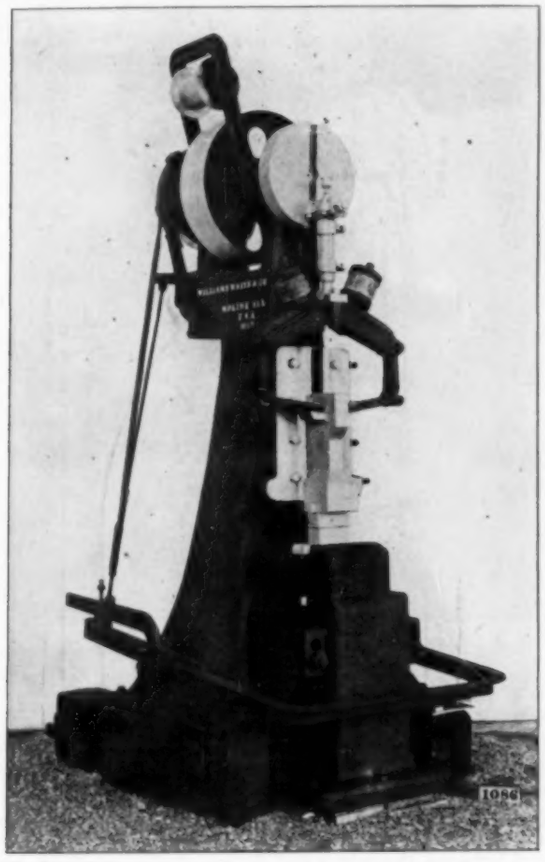
Marine Steam Turbines.—The Allis-Chalmers Co., Milwaukee, desires to call attention to the fact that it has the right, in conjunction with Wm. Cramp & Sons, Philadelphia, W. A. Fletcher Co., Hoboken, the Quintard Iron Works Co., New York, and the Bath Iron Works, Bath, Me., to manufacture Parsons marine steam turbines in this country. A recent news article on the steamship "Carmania" was so worded as to give the impression that a company which is a large builder of Parsons turbines for land use is also the builder of the Parsons marine turbine. This is not the case, the above companies being the only ones possessing the right to build this machine in the United States. In addition to this right, the Allis-Chalmers Co. has also the right to manufacture the Parsons turbine blowers and compressors. It has also recently formed an alliance with the Hon. Chas. A. Parsons for a full interchange of data on land turbines. It is at present about doubling its West Allis plant, the extension to be used for turbine work. At these works will be built marine turbines for use on the great lakes and Pacific coast, while at the Scranton, Pa., works will be built marine turbines for the Atlantic trade.

Sales Agencies Established.—In accordance with its recently announced policy of selling its products direct to the consumer, the Tennessee Coal, Iron & Railroad Co., through Frank A. Burr, general sales agent, has established the following sales offices; New York, Hanover National Bank Bldg., 5 Nassau St., in charge of E. B. Blandy; Chicago, The Rookery, in charge of A. H. Carpenter; Cincinnati, First National Bank Bldg., in charge of Willard Wilson; St. Louis, Missouri Trust Bldg., manager not yet selected. Sales offices are also maintained in Birmingham, Ala., and New Orleans.

NEW TYPE OF JUSTICE HAMMER.

The accompanying photograph shows a large type of the Justice hammer made by Williams, White & Company, Moline, Ill. Several new ideas are incorporated in this machine, principal among them being the rubber cushioned springs in place of the old steel bow springs with which it was formerly equipped. This hammer strikes a much harder blow than did the former type and can be stopped instantaneously by means of a mechanical brake, a feature not heretofore used. Although the machine is known as a 165 pound hammer, it will strike a blow equal to other hammers rated at 200 pounds and over.

The anvil of this hammer is planed and fitted to the frame, clamped and made absolutely tight to insure perfect alignment of dies.



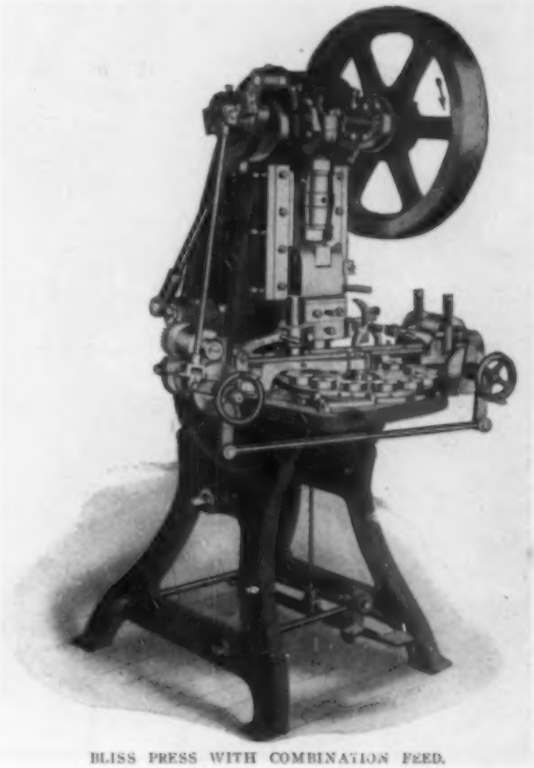
NEW TYPE OF JUSTICE HAMMER.

"BLISS" PRESS WITH SPECIAL COMBINATION FEED.

The machine shown in the accompanying illustration is a regular "Bliss" inclinable power press fitted with a special combination feed consisting of a double roll feed, an automatic dial feed and an automatic pickoff. The roll feed takes the material to be operated upon from the reel, and blanks or forms the first operation of the piece to be produced, dropping same into one of the pockets of the dial as it revolves. The dial feed carries the piece under the second punch where it is further operated upon. In some cases it is possible to have a third and even a fourth die, the dial feed carrying the piece successively under the several punches. The second set of feed rolls is used for keeping proper tension on the stock and also for carrying away the scrap.

As illustrated, the press is fitted to take heavy paper from the rolls and feed it over a cover which has been previously drawn in a combination die. The first punch cuts out a paper disk which is dropped into a recess in the cover—the cover being on the dial which passes under the blanking die. The second punch closes down the edge of the recess which holds the paper tight. The nature of the work is such that it is impossible for the finished article to fall through the pockets of the die, and in order to rapidly remove the work an automatic pickoff is employed. This consists of two fingers which are operated by a small arm to the slide. At every stroke of the press the gripping fingers close about the article and automatically eject it. All that is required of the operator is to keep the pockets of the dial full of the covers. This is done rapidly and without any danger to the operator's fingers, inasmuch as his hands need never be near any of the dies.

The feed is of a type which has a wide range of usefulness, and with modifications may be made to fit almost any type of press. This press has been built by the E. W. Bliss Co., Brooklyn, N. Y.



BLISS PRESS WITH COMBINATION FEED.

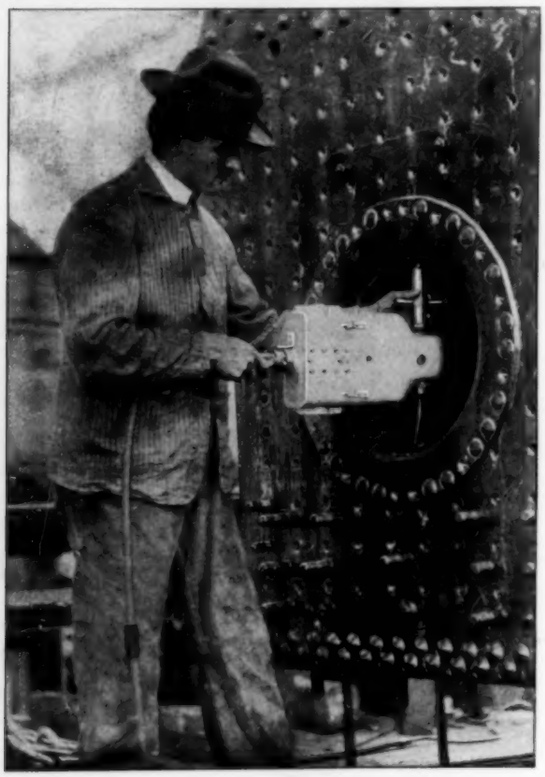
Foundation Stone Laid.—The foundation stone of the new building of the Engineers' Club, West Fortieth street, New York, was laid Dec. 23 by Mrs. Andrew Carnegie. The club was represented by its officers and committees, including President W. H. Fletcher and Past President John C. Kafer. During the afternoon the party inspected the building, now up in the steel work to the ninth story and in marble and brick casing to the third. Records, the list of membership and other archives of the club, plans of the building, a copy of Mr. Carnegie's letter of gift and papers and coins in part made up the contents of the box sealed in the cornerstone.

German shipyards Oct. 1 had under construction 72 vessels with an aggregate tonnage of 224,642 gross tons. This industry has made enormous strides during the last decade.

HELWIG PORTABLE PNEUMATIC MOTOR.

The above cut illustrates a reversible pneumatic motor built by the Helwig Mfg. Co., St. Paul, with which may be operated different kinds of tools used in the construction of ships, boilers, bridges, engines and other machinery. It possesses many new features which render it very desirable by manufacturers of this class of work.

As will be seen, the spindle is through the extreme end so it can be operated in very close quarters. The casing has a hinged lid by raising which the machinery may be readily inspected and oiled, which latter insures durability. The motor has two oscillating cylinders made of bronze brass, taking air at both ends, and the admission and exhaust are controlled by the oscillation. The trunnions have steel ferrules to protect them from wear. In the main frame there are two air chests (one on each side), one for live air, the other for exhaust, and by turning the handle half way around, the functions of these chests become reversed, thereby reversing the motion and readily controlling the same. By a ¾ turn of handle it stops. The air is admitted and exhausted through the handle which also has an adjustable collar which can be set so that the motor runs but one way only. It has a detachable handle which is used when the drill is suspended or when used for tapping and reaming.



HELWIG PORTABLE PNEUMATIC MOTOR.

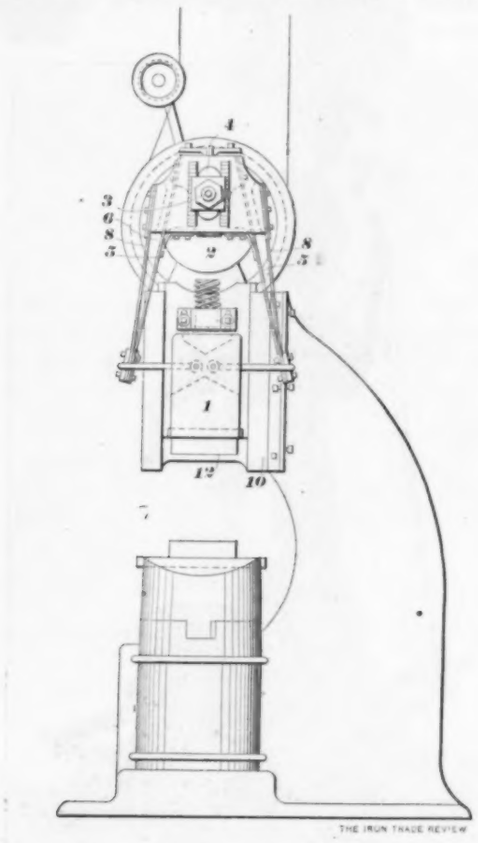
The largest motor of this type weighs 35 pounds and develops about two horsepower at 90 pounds pressure, consuming about 17 cubic feet of free air per minute. The maximum speed of the drill spindle in this size is about 200 revolutions per minute under 100 pounds pressure. The speed can be controlled by the handle or throttle to suit requirements.

This motor can be used in locomotive fire boxes to expand all the flues in the sheet with self-feeding expanders, drilling door sheets, and holes in flanges of I-beams by setting point of feed sleeve against one flange and the drill in the other. It has very few parts and is very compact and powerful.

POWER HAMMER.

Oliver Reynolds has invented a power hammer, the principal object of the invention being to secure a long and therefore an effective stroke of the ram, and to cause the intermediary resilient connecting means to expand, or absorb equal parts of momentum in equal increments of space traversed in its path of flexure and to provide a variable movement in the stroke of the ram. This the inventor claims to accomplish by regulating the movement of the ram through springs of a construction whereby they are made to offer a substantially uniform resistance of their flexural movement.

The novel element in this device lies in the cushioned or flexible connecting means or pitman connection interposed between the ram 1 and the crank disc 2, which, with its parts may be regarded as the driving member of the machine. On the wrist pin 3 is secured a sleeve which has a shoulder near the disc end, and on this sleeve is journaled a block which is provided with two sets of laterally arranged corrugations or teeth. By means of these teeth the pitman head is secured in any desired position to the block, which in turn is mounted on the wrist-pin sleeve, and in this manner an adjustable connection is effected between the pitman-head and crank disc. The pitman-head is a casting, irregular in form and of rectangular cross-section, and having the longitudinally centrally located slot 4, which is adapted to receive the sleeve on the wrist-pin of the crank disc. The slot permits the relative adjustment between the two. Cored passages are formed in each side of the casting and serve not only to lighten the same but also afford passageways through which extend the inner spring bars 5 of the springs 6. These spring bars are so arranged so as to converge upwardly, and are secured to the pitman-head 7 by means of cap screws which engage the slots in the



REYNOLDS POWER HAMMER.

inner end of the spring bars, the slots providing for longitudinal adjustment of the bars. A bearing plate is interposed between the heads of the cap screws and the end of the spring bars.

When the springs are in their normal positions, the inner spring bar as long as it remains rigid operates as a brace for the outer bar 8, and hence considerable inward force on the lower ends of the springs 6 will be required to start a deflection. Before flexure can begin the inner bars 5 must be forced into contact with the bars 8 at their outer ends. The portion of the springs in contact operates simply as a two-leaf spring, while the remainder of the inner bars act as a brace to support the outer one.

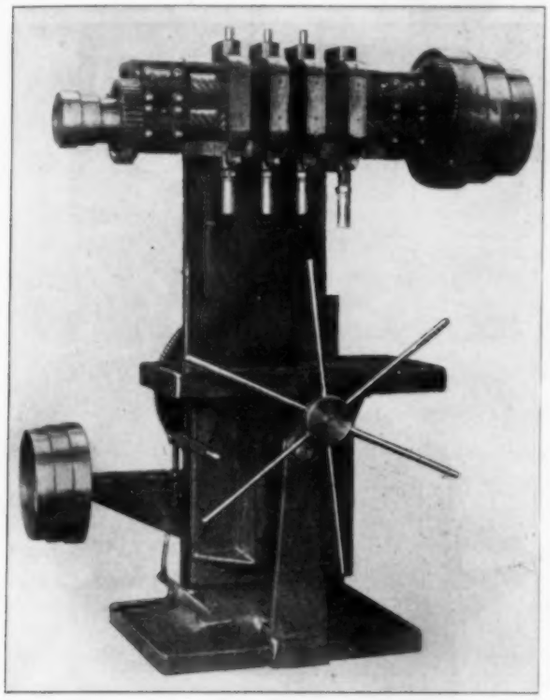


FIG 1.—HEAVY GANG DRILL, FRONT VIEW.

As flexure of both bars continues the non-contacting portion or bracing portion of the inner bar progressively decreases in length, and hence its effectiveness decreases. In this way the spring 6, formed by the two bars 5 and 8, will offer a substantially uniform resistance throughout its path of flexure, or will absorb substantially equal amounts of momentum in equal increments of space traversed in the path of flexure. In other words, substantially the same amount of energy is required to bend the springs through the first inch as through the last inch of flexure.

"Industrial Opportunities Not Yet Utilized in Massachusetts," is the title of a unique and valuable publication just issued by the state bureau of statistics and labor, through Charles F. Pidgin, chief. In this is gathered varied information concerning the smaller cities and towns of the state, their natural advantages for certain manufacturies, the available manufacturing sites, idle plants, etc. In the entire state but one iron works, one foundry, one wire plant and one machine works are reported in the abandoned list.

The steel floating dry-dock Dewey has started on its 14,000 mile cruise to the Philippines, having left Solomon's Island near Washington late last week. The trip, it is expected, will require about three months.

MOLINE HEAVY GANG DRILL.

In the accompanying illustration is shown a heavy gang drill, manufactured by the Moline Tool Co., Moline, Ill. Fig. 1 is a front view, showing the spindles, and driving mechanism. Fig. 2, a back view showing the arrangement of the feed mechanism.

The machine is built with a capacity up to ¾-inch holes, and with this size of drill holes can be drilled as close together as 2¼ inches. The spindles, four in number, run in bronze bushings and are driven from double spirals in the rail. Two spirals extend across the rail, each meshing with a spiral gear on alternate spindles. The spindles have adjustment sideways, and a slight vertical adjustment to compensate for varying lengths of drills.

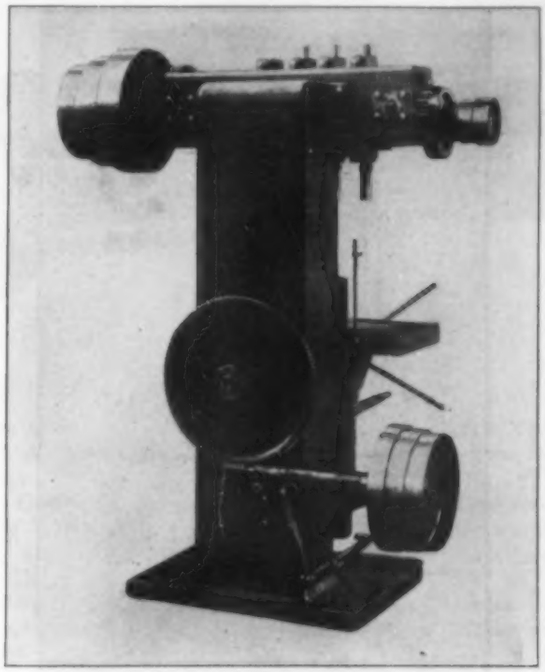


FIG. 2.—HEAVY GANG DRILL, BACK VIEW.

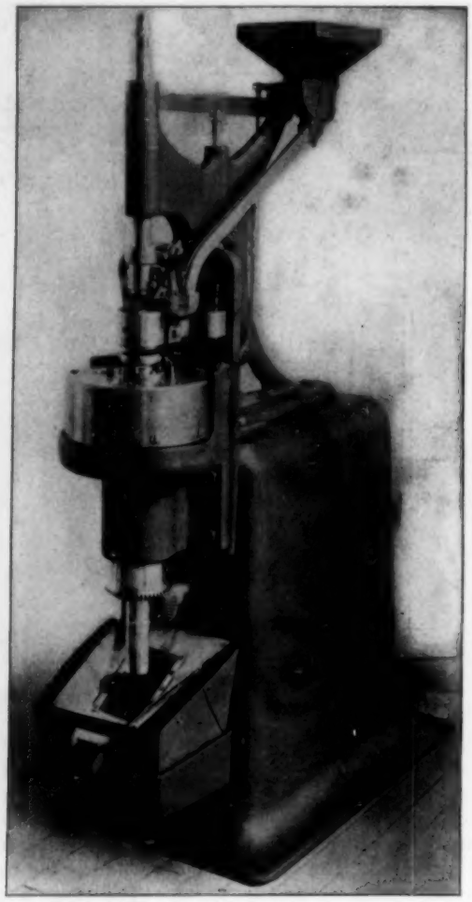
The feed is accomplished by moving the table vertically upwards, which may be done either by power or by means of the capstan wheel in front of the table. The power feed is through the worm and wheel at the back of the machine, the worm being driven from a cone pulley on one end of a spiral in the rail. The feed can be thrown in or out by means of the foot lever or handle shown. The table is counterbalanced, has a quick return, and an automatic stop.

United Engineering Society.—At a meeting of the board of directors of the American Institute of Electrical Engineers on Dec. 15, Mr. John W. Lieb Jr., was appointed trustee to represent the Institute for a term of three years upon the board of trustees of the United Engineering Society invested with the care and administration of the new United Engineering building. Mr. Lieb at the same time was made a representative of the Institute on the building committee. He succeeds Dr. Schuyler Skaats Wheeler, who by reason of his recent election to the presidency of the Institute resigns from these other bodies. The representation of the Institute therefore after the annual meeting of the United Engineering Society in January will consist of Messrs. Charles F. Scott, Bion J. Arnold and John W. Lieb Jr., who are past presdents of the Institute in the order named. Work on the building is in active progress, and it is expected to lay the corner stone early in the spring.

THE TYLER AUTOMATIC NUT TAPPER.

A nut tapping machine in which the tap runs continuously forward, and in which the nut is threaded and discharged from the tap, without the latter being reversed or backed out, is the invention of F. C. Tyler, of Cleveland, and is manufactured under his supervision by W. D. Fraser, 80 Seneca street, Cleveland. The machine is shown in the accompanying illustrations.

On the upper part of the machine is a hopper in which the blanks are placed. The hopper is so devised as to feed the blanks, without clogging, to a run way which conveys them by gravity to the nut box. The blanks are fed from the nut box by a kicker, to a plunger, which

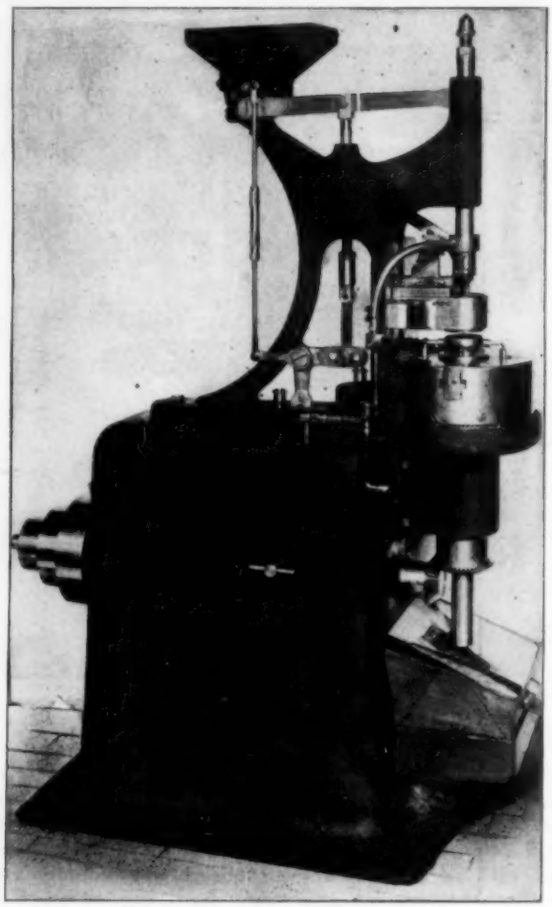


FRONT VIEW OF TYLER NUT TAPPING MACHINE.

feeds them to the tap. The kicker places them in two fingers carried on the lower end of the plunger. These fingers grasp the nut and clamp it against the plunger, while it is being conveyed to and upon the tap. This clamping action of the fingers is an important feature of the machine, being positive, and causing the nuts to be tapped square with their faces. When the nut has been carried a sufficient distance to insure its being firmly engaged by the tap, the fingers automatically release it and the plunger returns to its uppermost position and is ready to receive another blank.

The downward travel of the plunger is not positive, but is controlled by a spring which allows the plunger to follow the pitch of the tap. In case imperfect or solid blanks are fed to the tap, or if the blanks clog in the passage leading to it, the spring allows the plunger to dwell and no damage to the tap or operating parts results. The actuating mechanism of the plunger is a cam giving a slow advance with quick return. The cam is driven through a change gear mechanism, allowing the feeding of a greater or less numebr of blanks to a given number of revolutions of the tap. The operator thus has the feed mechanism under complete control at all times.

The tap is held and driven by a chuck which has two pair of jaws, one of which takes hold of the tap near its lower end; the other grips it at a point sufficiently higher to allow two or more nuts to be on the shank of the tap between the jaws without interfering with their action. The two pair of jaws open and close alternately allowing the nuts to pass through the upper and lower jaws, and then through the shank of the chuck into the receptacle below. The jaws are operated by a cam within the head



SIDE VIEW OF TYLER NUT TAPPING MACHINE.

of the chuck. The upper or threaded part of the tap revolves in a square bushing which forms a part of the nut box, and which prevents the nuts from revolving while they are being tapped.

All revolving parts of the machine run in phosphor bronze bearings. The weight of the chuck is carried on a steel friction ring which runs on a bronze bushing, and which can be adjusted for wear. All wearing parts of the machine are hardened and ground, and all gears are cut.

The bearings are lubricated by means of readily accessible oil cups. Oil is fed to the drill by means of a pump delivering to the plunger through a flexible connection.

The chips are retained in the upper part of the oil basin, while the oil is strained and used over again. The tapped nuts are delivered into a tote box at the front of the machine.

The machine occupies a floor space 18 x 28 inches and is 52 inches high. It will tap nuts varying from ¼ to 7-16 inch inclusive and has a capacity of from 1,800 to 2,000 nuts per hour.

PUMPING MACHINERY FOR ACID MINE WATER.

The severe conditions of modern deep mining often necessitate the use of special mining machinery, as the success or failure of the undertaking, compels the engineers and mine owners to be exact and sure in the selection of the pumping machinery to be installed. The selection of a large pumping plant is always a matter of vital importance, and requires a thorough knowledge of the situation and appreciation of the surrounding conditions.

In the anthracite and bituminous coal fields, and also in the Montana copper territory, the water to be pumped from the mines is usually highly impregnated with sulphuric and other acids, which are destructive to unprotected parts of machinery coming in contact with them The water ends of the pumps must, therefore, be designed to withstand not only the heavy pressures, as the lifts are often very high, but also the corrosive action of the water, to insure a satisfactory duration of service.

Hence there are no factors so valuable to the pump designer and builder as a thorough knowledge of the requirements, and successful experience in meeting them through superior design and manufacture. When pumps are to be installed down in the mines, they should be so sectionalized and with parts relatively light that any or all can be removed or replaced at minimum cost and time. They should also be simple in design, having few working parts and none exposed to external damage, yet accessible and easy to operate, so that comparatively inexperienced men can run them, should necessity arise; further, these pumps should be compact on account of the comparatively small area of mine shafts. In addition to the requisites already mentioned, it is essential that the pump be of perfect construction, and reliable in service, from the fact that often in an emergency a pump may be submerged until it unwaters the mine, or run continuously for months without stopping, to prevent the mines from becoming flooded.

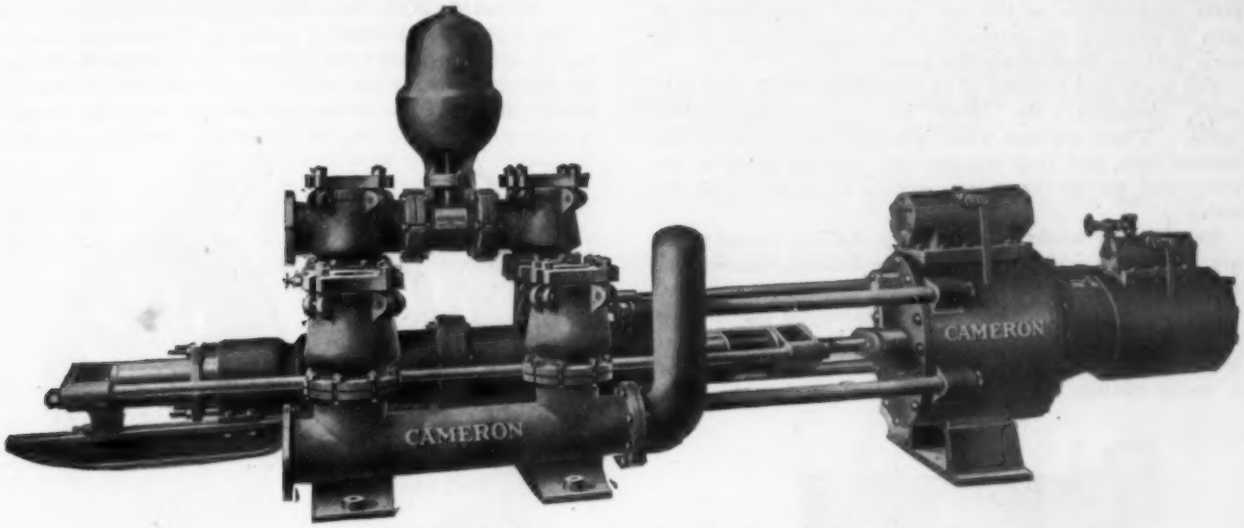


FIG. 1—CAMERON SIMPLEX, OUTSIDE PACKED, PLUNGER PUMP.

From among the numerous types of mine station pumps, we illustrate and describe one of the most recent designs a simplex outside packed, pot valve, plunger pump, built by the A. S. Cameron Steam Pump Works, of New York. Fig. 1, shows the Cameron simplex,- outside packed, plunger pump with pot valve water end, and compound steam cylinder, in which both the high and the low pressure cylinders are of the well known Cameron type, and have all the reliable characteristics peculiar to the Cameron. Their steam mechanism consists of few working parts, and is without any outside valve gear. It is absolutely positive in action, requiring no more skill to run than a simple pump, from the fact that it is without intervention of arms or levers.

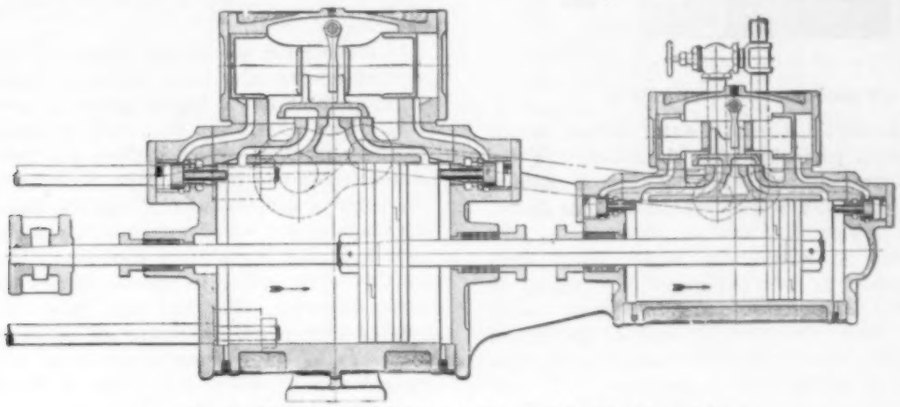


FIG. 2—SECTION OF STEAM CYLINDERS OF CAMERON PUMP.

Fig. 2 defines very clearly the construction of these cylinders, both being well proportioned, of hard, close-grained iron, and of ample thickness to allow reboring if necessary. The steam ports are of such size and arrange-

ment as to allow the pumps to be operated at very high speed, with the least friction and back pressure. In fact, the Cameron pump can be run without danger of breaking at a very high speed. The connections between the steam and the water ends are made by means of steel tie rods, two on each side; these are bolted to the lugs on the sides of the cylinders, and so arranged as to allow the low pressure cylinder heads to be removed at any time; this gives complete accessibility to the low pressure steam piston as well as enabling the removal of the plunger when necessary, without dismantling the pump.

The water end consists of two working barrels and four valve chambers; the latter being commonly called "pots." There are two water plungers connected to the outside rods, and they are the only moving parts in the water end, except the valves, coming in contact with the water.

The plunger works through deep stuffing boxes, which are lined with acid resisting bronze bushing that can be easily removed and renewed when necessary.

The interior arrangement of the valves of chambers is clearly shown by the sectional view, Fig. 3. The valve chamber 1 and cover 2 are well proportioned, and are cast of a special mixture of hard closed grained iron.

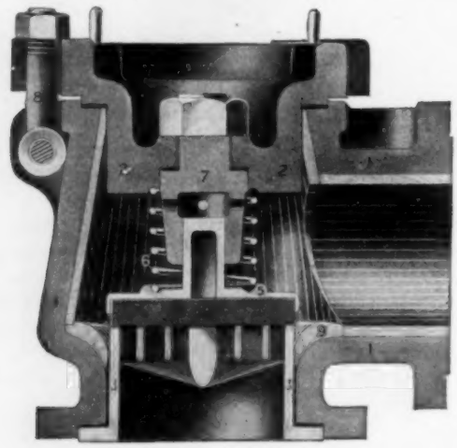


FIG 3.—INTERIOR OF VALVE CHAMBER.

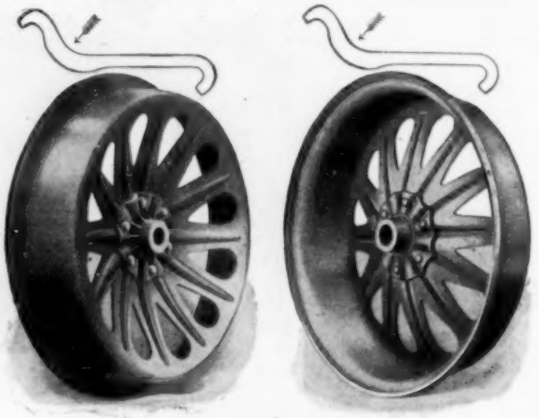
These chambers contain separate water valves, which consist of the several parts hereafter described. Valve seat 3 is a substantial acid resisting bronze casting securely held in place and which cannot become loose. The valve 4 is a rubber disc and is protected by the heavy bronze guard 5, which also serves as a stem working in the guide 7. A section of the spring is also shown at 6. The use of a large single water valve in each of these chambers instead of groups of smaller valves, allows the passage of comparatively large solid bodies, such as pieces of coal and dirt which may enter with the water and would otherwise clog the valves. Each of the chambers is fitted with covers held in place by four swing bolts, making the water valves easily and readily accessible.

A distinctive feature of these water cylinders is that the metal throughout is of extra thickness, and in addition when ordered and necessary to resist corrosion, wood-lined with sound white pine, (see 9), which is securely wedged in place, to be water-tight. All the water passages can be provided with either wood, bronze, or lead linings, to meet the varied requirements and these linings can be replaced when necessary at minimum cost. The velocity of the passage of water through the valves and chambers is reduced to as low a rate as possible by ample valve area and large water passages.

It is often essential to build this pump as a twin, consisting of two independent pumps, connected together by means of Y pieces, ells, gate valves, &c., so that they may be run together, or separately when desired; thus giving an extremely high range of capacity and power.

KALAMAZOO PRESSED STEEL WHEEL.

The Kalamazoo Railway Supply Co., Kalamazoo, Mich., has recently developed the pressed steel wheel shown in the accompanying illustrations. In the process of manufacture, the thickness of metal at the throat of the flange is increased from ⅛ to 3-16 of an inch, thus making the



FRONT AND BACK OF PRESSED STEEL WHEEL.

thickness at that point nearly double that of the rest of the wheel when ¼-inch plate is used. The flange conforms to the M. C. B. standard in height and thickness, and is made so as to form a cup which will not take up gravel or sand and afterward discharge it into the bearings.

The center of the wheel is corrugated, the corrugations extending from the rim to the hub. The two flanges forming the hub are corrugated and interlock with the corrugated center, making a perfect fit and preventing the shearing of rivets.

SECTION OF WHEEL

In making the wheels, the plates are first sheared into circular form, and then shaped at white heat under heavy hydraulic pressure. The wheels are then run through a finishing machine, which gathers the metal at the flange and increases the thickness at the point of greatest wear. From the finishing machine the wheel passes at a red heat to a hydraulic press fitted with sizing dies so that every wheel is given exactly the same diameter. The hub and flange are pressed into place by means of hydraulic pressure and the riveting is also done cold by hydraulic pressure. The wheel is dished considerably toward the center, and the corrugations of the center increase the weight-bearing qualities.

The Kalamazoo Railway Supply Co. has been reorganized during the past year and has made additions to its shop equipping it with the latest types of machine tools.

Iron and steel and their manufactures form a constantly increasing item in our exports to Argentina. In 1904 they made up 22.5 per cent of our trade with that country. European competition is making itself increasingly felt it is charged through the unwillingness of Americans to devote much attention or capital to building up trade in this direction.

Closing Stock Prices Near Highest of Year.

The market for securities during the closing week of the year developed a number of unusual features. Call money rates on the first trading day of the week went to 40 per cent, the highest in two years, only to break that record on Wednesday by reaching 90 per cent, highest mark since 1901 and on Thursday to exceed that level, going to 110 on the exchange and 125 outside. Stringent conditions continued through Friday, with marked improvement on Saturday. In spite of this deterrent factor, however, trading was as active as at any time in the year, sales averaging 1,500,000 shares daily, with those of Friday approximating 2,000,000. Prices sagged somewhat heavily on the first developments of an abnormal money rate, but recovered quickly, and through the week continued strong, with securities in many lines recording the highest levels of the year. The Tuesday range of prices was the highest average for 1905—but these were in a score of instances still further advanced on Saturday, when, with trading of over 1,000,000 shares in two hours, a score of stocks gained sharply, United States Steel common being conspicuously in the lead. The net result of the week was a general increase in quotations of industrial securities, few of the iron, steel and allied stocks showing considerable loss. Especially in these lines the new year opens with all conditions pointing to a long stretch of unbroken and increasing prosperity. Bookings of business are in many instances to the season's capacity at profitable prices; the same conditions prevail in practically every other line of commercial and manufacturing activity and the earning power of industrials during 1906 should materially increase. This tendency has already been somewhat discounted on Wall st., but it has probably not been taken advantage of to the extent merited, and further advances may be expected.

Financial Notes.

Net earnings of the Cambria Steel Co. for 1905, are estimated at $3,800,000, the largest since 1902 and practically double those of 1904. They are estimated as about 8 per cent on its capital stock in 1905 as against 3.9 per cent in 1904, 6.6 per cent in 1903 and 9.6 per cent for 1902. The surplus for the year is about $2,250,000, most of which will go into needed improvements. Rumors of an increase in dividend rate are discredited by directors.

Recent dividend declarations include the following: George's Creek Coal & Iron Co., semi-annual of $2 per share, payable Jan. 3; United Metal Selling Co., 20 per cent involving a distribution of $1,000,000, paid during the past week.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quotation Dec. 23	Closing Quo. Dec. 30	Changes	Date of 1906 Ann. Meet.	Par Value	Capital Outstanding	Dividend		
							Basis	Being Paid	Date Last Div. Dec.
Allis-Chalmers Co	22	22⅛	+ ⅛	Sept. 6	100	19,820,000		.....	.....
Allis-Chalmers preferred	62	62	.....		100	16,150,000	7 cum	.....	Feb., 1904
AmericanCan	9	10	+1	Apr. 24	100	41,233,300		.....	.....
AmericanCan preferred	68¼	69¾	+1½		100	41,233,300	7 cum	5 Q.	Jan., 1906
AmericanCar and Foundry	39⅜	40¾	+1⅜	June 28	100	30,000,000	.....	.....	May, 1905
AmericanCar and Foundry preferred	99¾	100⅜	+ ⅝		100	30,000,000	7 n. c.	7 Q.	Jan., 1906
AmericanLocomotive	69	76	+7	Oct. 16	100	25,000,000		.....	.....
AmericanLocomotive preferred	116½	117	+ ½		100	24,100,000	7 cum	7 Q.	Jan., 1906
AmericanShipbuilding	57¾	57	— ¾	Oct. 2	100	7,800,000	4	4 Q.	Dec., 1905
American Shipbuilding preferred	105	104½	— ½		100	7,800,000	7 n. c.	7 Q.	Jan., 1906
American Steel Foundries	13⅞	14⅜	+ ⅝	Oct. 3	100	17,700,000		.....	
American Steel Foundries preferred	49¼	50⅛	+1⅜		100	17,700,000	6 cum	.....	Aug., 1904
Barney & Smith	22½	20	—2½	June 5	100	1,000,000		.....	June, 1893
Barney & Smith preferred	124	126	—2		100	2,500,000	8 cum	8 Q.	Dec., 1905
Bethlehem Steel	32	33	+1	April 3	100	15,000,000		.....	
Bethlehem Steel preferred	88	89½	+1½		100	15,000,000	7 n. c.	7 Q.	Nov., 1905
Bullock Electric preferred	114	114	.....	Oct. 2	100	1,000,000	6	6 Q.	Jan., 1906
Cambria Steel	28¼	30¾	+2½	March 20	50	45,000,000	6	3 S. A.	Aug., 1905
Cambria Iron	49	49	.....		50	8,468,000	4	4 S. A.	Jan., 1906
Colorado Fuel & Iron	55½	56½	+ ⅝	Oct. 15	100	30,132,000	7	.....	Apr., 1902
Wm. Cramp & Sons Ship & Eng. Bldg. Co.	25	25	.....	May 31	100	6,098,000	5	.....	Nov., 1902
Crucible Steel	13¾	13⅝	.....	Oct. 17	100	25,000,000		.....	
Crucible Steel preferred	69¾	70	+ ¼		100	25,000,000	7 cum	.....	Sept. 1903
Empire Steel	6	6	.....	Feb. 28	100	2,281,400		.....	
Empire Steel preferred	39	39	.....		100	2,500,000	6 cum	3 S. A.	Jan., 1905
Fay & Egan	90	95	+5	Feb. 20	100	1,000,000	5	5 Q.	Nov., 1905
Fay & Egan preferred	120	120	.....		100	1,000,000	7 cum	7 Q.	Nov., 1905
General Electric	176¾	177	+ ¼	May 8	100	48,256,050	8	8 Q.	Jan., 1906
International Pump	27	26	—1	June 5	100	12,262,500		2	July, 1905
International Pump preferred	80¼	78	—2¼		100	8,850,000	6 cum	6 Q.	Nov., 1905
Lackawanna Steel	81	81	.....	March 14	100	34,971,400		.....	
Lake Superior Corporation	17⅞	18	+ ⅛	Oct. 3	100	40,000,000		.....	
Niles-Bement-Pond	121	121	.....	Feb. 7	100	5,000,000	6	6 Q.	Dec., 1905
Niles-Bement-Pond preferred	103⅝	103⅝	.....		100	2,000,000	6 cum	6 Q.	Nov., 1905
Otis Elevator Co	60	60	.....	March 19	100	6,350,300		2 A.	Apr., 1905
Otis Elevator Co. preferred	107	107	.....		100	5,589,500	6 n. c.	6 Q.	Jan., 1906
Pittsburg Coal Co	15	15	.....	Feb. 12	100	30,135,000		.....	
Pittsburg Coal preferred	62	62	.....		100	30,716,200	7	.....	Apr., 1905
Pressed Steel Car	55⅝	55	— ⅝	Feb. 21	100	12,500,000		3	Aug., 1904
Pressed Steel Car preferred	100	100¼	+ ¼		100	12,500,000	7 n. c.	7 Q.	Nov., 1905
Pullman Palace Car	246	245	—1	Oct. 18	100	74,000,000		8 Q.	Nov., 1905
Railway Steel Spring	59	61	+2	March 1	100	13,500,000		4 S. A.	Oct., 1905
Railway Steel Spring preferred	103½	105	+1½		100	13,500,000	7 cum	7 Q.	Dec., 1905
Republic Iron & Steel	32⅞	34	+1⅛	Oct. 17	100	27,352,000		.....	
Republic Iron & Steel preferred	104	106¼	+2¼		100	20,852,000	7 cum	7 Q.	Jan., 1906
Sloss-Sheffield	88	89½	+1½	March 14	100	7,500,000	5	5	Jan., 1906
Sloss Sheffield preferred	110	110	.....		100	6,700,000	7 n. c.	7 Q.	Jan., 1906
Tennessee Coal & Iron	135¾	131½	—4¼	May 15	100	22,552,800		4 Q.	Jan., 1906
U. S. Cast Iron Pipe & Foundry	44¼	45⅝	+1⅜	June 27	100	12,500,000		1	Dec., 1905
U. S. Cast Iron Pipe & Foundry preferred	92	94¼	+2¼		100	12,500,000	7 n. c.	7	Dec., 1905
U. S. Steel	39½	43⅛	+3⅝	April 16	100	508,302,500		.....	Dec., 1903
U. S. Steel preferred	105⅜	106¾	+1⅜		100	360,281,100	7 cum	7 Q.	Nov., 1905
U. S. Steel 5's	96⅛	96⅞	+ ⅝		100	463,798,000	5	5 A.	
Virginia Iron, Coal & Coke	48½	50½	+1⅞	Sept. 18	100	8,641,600		.....	
Westinghouse Electric	176	170	—6	June 27	50	20,996,350	10	10 Q.	Jan., 1906
Westinghouse Air Brake	154	153	—1	Oct. 2	50	10,990,450	20	20 Q.	Jan., 1905

NEWS FROM MANY INDUSTRIES.

New Buyers:—

The Durham Buggy Co., Durham, N. C., has been incorporated with $25,000 capital stock by W. T. O'Brien, George W. Watts, J. E. Stagg, F. L. Fuller and others.

The Killian Fire-Brick Co., Killian, So. Car., has been incorporated with $25,000 capital stock to manufacture fire-brick, etc. T. M. Waring is president and treasurer and H. F. Hayne, secretary.

The Great Lakes Cement Machinery Co., Detroit, Mich., has been incorporated with $50,000 capital stock. The officers are: president, R. R. Bane; secretary, F. H. Zeigen, who with W. R. Chapman form the temporary board of directors. The company has purchased the buildings of the Detroit Hydraulic Stone Co.

The Bandotype Co., New York, has been incorporated to manufacture machinery. The capital stock is $30,000 and the incorporators are: Byron A. Brooks, 280 Broadway; George C. Horwood, 45 Broadway; Ernest D. Condit of the same address and John H. Paine, 206 Broadway, all of New York.

The Western Foundry Supply Co., Kansas City, Mo., has been incorporated with a capital stock of $18,000. The incorporators are: Jas. A. Rogers, Walter Maddox, H. L. Nixon and C. M. Rogers.

The Michigan Pipe & Iron Co., Lenox, Mich., has been incorporated to manufacture sewer pipe. The authorized capital stock is $50,000 of which amount $25,000 has been subscribed and paid in property.

The Detroit Steel Pulley Co., Detroit, Mich., has been incorporated to manufacture and sell steel pulleys with a capital stock of $50,000 of which $25,700 has been subscribed.

The McPhail Molding Machine Mfg. Co., Davenport, Iowa, has been incorporated with a capital stock of $20,000. The company has equipped its plant with the necessary machinery and is already doing business.

The Purcellville Foundry Co., Purcellville, Va., has been incorporated with an authorized capital stock of $15,000 to operate a foundry. J. D. Dillon is president, and C. W. Case, secretary and treasurer.

The Burr Oak Wagon Co., Kansas City, Mo., has been incorporated with $25,000 capital stock by S. H. Velie, Tom A. Velie and G. N. Peck.

The Climax Machinery Co., Indianapolis, has been incorporated with a capitalization of $150,000 by Chester Bradford, James E. Lilly, R. B. Hilleary, Geo. W. Faris, Arthur McCain, Theophilus King and Charles Sloan.

The Illinois Iron Lands Co., Superior, Wis., has been incorporated for $50,000 by Frank W. Tubbs, J. O. Sinclair and W. J. Tubbs.

The Brown-Lipe Gear Co., Syracuse, N. J., has been incorporated with a capital stock of $150,000 to manufacture gears and conduct a foundry and a machine shop. The incorporators are:—Alexander T. Brown and Willard C. Lipe, both of Syracuse and H. Winfield Chapin of No. 1012 West Genesee street, Syracuse.

The American Instrument Co., No. 16 Lawrence street, Newark, N. J. has been incorporated with a capital of $300,000 to manufacture mechanical devices. The incorporators are:—Adelbert O. Benerke, Frederick C. Fischer, and Benjamin L. De Cou, all of the address given.

The Concrete-Steel Co., New York, incorporated with a capital of $150,000, will manufacture concrete, concrete steel etc. The incorporators are:—T. Edwin Tomlinson, No. 40 East Fifty-eighth street, William B. Nesbit, No. 587 Madison avenue; Henry Hunthorne,Lyndhurst, N. J. Robbins Gilman and A. B. Halliday, Yonkers, N. Y.

New Construction:

The Rockford Mfg. Co., Rockford, Ill., has under construction a new foundry building 30 x 80 feet, which will occupy early in the year.

The French Mfg. Co., Hartford, Conn., is having erected a brick factory building in which it will begin the manufacture of tubing in small sizes.

The Standard Roller Bearing Co., Philadelphia, has started the erection of a brass and iron foundry 60 x 125 feet, two stories. Its crucible steel casting plant was placed in operation during the past week, in a new building 60 x 95 feet.

The Foster Engineering Co., Newark, N. J., manufacturing principally marine engine parts, is making extensive improvements to its plant, with the aim of increasing its capacity. A new boiler house and engine room, an acid house and testing and blueprint rooms are being erected. A 100-horsepower Corliss engine is to be installed and arrangements are under way to have all the machinery electrically-driven. Runyon & Carey, engineers of Newark, have the improvements in charge.

Work is being pushed on the erection of the plant of the Morse Chain Co., Ithaca, Mich., the buildings all being under roof. One 20-ton crane and one of five tons capacity will be installed in the foundry building and power plant. The plant will be in operation by early spring.

The Aluminum Mfg. Co., Two Rivers, Wis., contemplates erecting a two-story addition to its plant 42 x 140 feet, of brick and steel construction. S. C. Coddington, of the Modern Steel Structural Co., Waukesha, Wis., is drawing the plans No additional equipment will be needed.

The Mark Mfg. Co., Chicago, has let the contract for a building 87 x 204 feet as an addition to its plant at Zanesville, O. Samuel Huffman and W. C. Handschy have the work of construction in charge.

The Fort Worth Iron & Steel Works has prepared plans for improvements which will practically double the capacity of its plant at Fort Worth, Tex.

A machine shop 45 x 100 feet is being erected by Miller Brothers, contractors of Lebanon, Pa., for the Cornwall Railroad Co. at its roundhouse in that city.

The Louisville Tin & Stove Co., Louisville, Ky., has purchased a site and is preparing plans for the erection of a five-story brick building, 100 x 200 ft.

The United Iron Works Co., Springfield, Mo., has recently expended $25,000 on buildings and equipment. Reed & Heckenlivley, Springfield, Mo., prepared the plans for the buildings.

The Griffin Wheel Co. is preparing to make the following additions to its plant at Twelfth street and the Belt railway tracks, Kansas City; pit room 75 x 220 feet, charging room 50 x 100 feet, core room 55 x 64 feet, and carpenter shop 40 x 60 feet. The foundry will also be extended forty feet to the west and ten new "floors," each containing 22 wheel molds, will be added. Other improvements, the total cost of which will be about $175,000, will almost double the capacity of the plant. The work is in charge of F. I. Cordo of Chicago and C. F. Womeldorf, an engineer in the Kansas City construction department.

The West Allis Malleable Iron & Chain Belt Co., West Allis, Wis., has just completed improvements which will

double the company's capacity. A foundry addition 70 x 224 feet with reverberative furnace and two more annealing ovens and a two-story addition 70 x 64 feet to the shipping room and machine shop, installed with a battery of 12 sly barrels, are ready for operation.

The Union Ballast Co., New York, has awarded the contract for the designing and erecting of a new foundry at its plant at Long Island City to the Miller-Collins Co., New York. The building will be constructed of structural steel with plank and composition roof, and concrete block walls on pile foundations. The company has not yet placed the contracts for its requirements.

The Stanley Works, New Britain, Conn., have plans prepared for extensive improvements, part of which will include a machine shop 60 x 130 ft. and a boiler house 40 x 50 ft.

The Payne & Joubert Machine & Foundry Co., recently incorporated with a capitalization of $100,000, will erect on a site recently purchased in East Birmingham, Ala., a modern plant for the manufacture of sugar-mill machinery. Other lines of production, particularly in boiler and sheet metal, may be developed later. The main building, of brick and steel construction, will be 150 x 400 feet, and will be rushed to completion. Charles Bowron will have the work in charge. The new company is a branch of the firm of Payne & Joubert, boiler makers of New Orleans. R. S. McKnight, who has resigned as district treasurer of the Republic Iron & Steel Co., will be vice president and general manager.

A one-story brick storehouse 45 x 60 feet, is being erected by the Geometric Tool Co., New Haven, Conn. A brick building two stories, 38 x 180, is to be added to the factory which, with other improvements will about double the capacity. Considerable new machinery will be required.

The Veneer Box & Panel Co., Greenville, Me., contemplates the erection of a new mill 100 x 350, to take the place of the one which was destroyed by fire last summer. It is estimated that 250 horsepower will be generated for driving the machinery.

The enlarged foundry of Louis Sacks, Newark, N. J. is ready for occupancy. The addition just completed is 100 feet long making a total floor space in the building of 200 by 50 feet.

M. W. Kellogg & Co., 37 Dey street, New York, are building a new foundry in Jersey City, N. J. The plant will be ready for operations in about two months.

W. & A. Fletcher, engine builders, Hoboken, N. J., are erecting an addition at the south end of their main machine shop. The structure will add 100 feet to the length of the building and will be used for some of the larger operations of the plant. A very large boring mill is to be installed, and besides a large lathe, several other machines, including planers, etc.

Fires:—

The molding department of the Colebrookdale Iron Co.'s plant at Little Oley, Berks County, Pa., a few miles from Boyertown, was visited by fire Dec. 23, damage of about $2,500 resulting.

The foundry and engine rooms of the E. C. Stearns & Co. plant at Syracuse, N. Y., were threatened by fire Dec. 20, but the flames were confined to a section of the buildings little used, and the loss was nominal.

The plant of the Delaware Clay Mfg. Co., Delaware, O., was completely destroyed by fire Dec. 25, the loss being in the neighborhood of $10,000. A high wind blew down the walls of the five-story building left standing after the fire.

The oil and paint shop of the Pressed Steel Car Co., Pittsburg, was destroyed by fire Dec. 29, with a loss estimated at $25,000. Sparks from a passing engine are believed to have started the blaze, which spread rapidly owing to the inflammable nature of the building's contents. The explosion of large tanks of naphtha, turpentine, etc., made the fire extremely difficult to check. Only the one department, however, was damaged, and the company was not crippled to any extent, work being continued in the other departments as usual.

The plant of the American Ship Building Co., at Bay City, Mich., was destroyed by fire Dec. 30, entailing a loss conservatively estimated at $100,000. Plans have already been prepared for rebuilding and the work of construction will start in the immediate future, with the aim of having the plant ready for the heavy building operations of the 1906 season.

The DeKalb Iron Works, Auburn, Ind., sustained a loss of $10,000, Dec. 23 when the plant was practically destroyed by fire supposed to have been started by a hot casting.

The Rio Grande car repairing shops at Salt Lake City, which were burned Dec. 20 with a loss of $35,000, will be rebuilt on a more extensive scale and at a probable cost of $60,000.

General Industrial Notes:

The Bodifield Belting Co., Cleveland, has changed its name to the Republic Belting & Supply Co. The company was formed about 20 years ago by C. T. Bodifield, founder of the Akron Belting Co., but after he had built up the business, ill health forced his retirement in 1904. The new management which then took charge has added full lines of mill supplies and mechanical rubber goods, aiming to carry everything in the way of power transmission and foundry supplies. The equipment of the leather belt factory has recently been overhauled and new machinery has been added. Business during 1905 was remarkably heavy, showing a gain of 75 percent over that of 1904; all lines have met with favor and the name is changed to one sufficiently broad to cover the diverse interests of the company. E. C. McKay is president.

Charles H. Myers, formerly with the American Plate & Boiler Co., has established the Myers Boiler Works on West Spring Street, Columbus, O.

Charles E. Dustin, as receiver of the Hartford Foundry Co., Hartford, Conn., has been authorized by the courts to continue the business for six months in order to work up a quantity of raw materials now on hand into finished articles in which shape they can better be disposed of.

A. Goldman & Co., Detroit, have purchased two and one-half acres on the line of the Michigan Central for a scrap iron yard. They are in the market for track scales, wagon scales, shears and other machinery.

The Cherokee furnace of the Alabama & Georgia Iron Co., located at Cedartown, Ga., is again in blast after a shutdown of several months.

J. F. Gauss has purchased the furnace business organized at Marshall, Mich., in 1870 and will continue it as the Dobbins Furnace Co. under the general management of J. L. Dobbins, its former owner.

The Vandyck-Churchill Co., New York, manufacturing machine tools and equipment, on Jan. 1 will open a branch office in the Farmers' Bank Bldg., Pittsburg.

The plant of the Delaware River Steel Castings Co., Chester, Pa., was purchased for $140,000 at the recent trustees' and receivers' sale by William B. Broomall, acting presumably for the bondholders. It is reported that the works will soon be placed in operation. Among the raw materials sold separately was a quantity of ferromanganese iron which was bid in at $131 per ton by John J. Hayes of Chester.

The Wolverine Motor Works, Inc., Grand Rapids, Mich., has purchased 1,300 feet of water frontage at Bridgeport,

Conn., and will locate there in the near future. As soon as the machine shop is erected the company proposes to remove that part of its plant which is used in the manufacture of large gasoline engines.

Improvements which will cost in the neighborhood of $20,000 are being made by the National Rolling Mill Co., Vincennes, Ind. The plant which has been shut down since Nov. 17 will be put in operation about the middle of January.

The Milwaukee School of Trades, all departments of which were opened Jan. 2, has chosen the following list of instructors: James S. Church, managing director; Hans Birkholz, principal and instructor in mechanical drawing and machine designing; Charles G. Jurach, instructor in pattern making, and James Leadbeter, instructor in plumbing. About 100 students have enrolled in the evening classes and between 50 and 75 in the day school.

The Robb-Mumford Boiler Co., successor to Edward Kendall & Sons, has moved from Cambridge, Mass., to its new plant at South Framington, Mass.

The Indiana Road Machine Co., Fort Wayne, Ind., has purchased the road-making and earth-handling machinery department of the business of the National Drill & Mfg. Co., Barberton, O., a part of the Stirling Co. of that city. Possession was secured Jan. 1. Some of the machines made by the National Company will be continued by the purchasing company, which reports, however, that its plans are not yet completed.

The Dunn Machinery Co., recently incorporated at Atlanta, Ga., is in the market for black, wrought iron, galvanized piping, valves and fittings. The new company does a general machinery business.

Trade Notes:—

Milliken Bros., Inc., New York, have let the contract for the boilers for their new open hearth steel plant and rolling mill at Staten Island, 4,000 horse power being required, to the Babcock & Wilcox Co. The contract for the electric traveling cranes, of which there are quite a large number, has been placed partly with the Morgan Engineering Co. and partly with Manning, Maxwell & Moore, Inc., agents for the Shaw Crane Co. The contract for the large machines for the mills has been placed with the Southwark Foundry & Machine Co., of Philadelphia.

The Dubuque Boat & Boiler Works, Dubuque, Ia., has the contract for building for the St. Louis & Mississippi Railway Transportation Co. what, it is said, will be the largest river craft ever constructed on the Mississippi. It will be 305 feet over all with a 52½-foot beam and will be practically all of steel construction.

The Niles Tool Works, Hamilton, O., has completed the installation at the plant of the Lake Shore Engine Works, Marquette, Mich., of a 14-foot boring machine which weighs 37 tons.

The Harbison-Walker Refractories Co., Pittsburg, reports among contracts recently filled or in process of filling, orders for about 17,125,000 brick for furnace linings as follows: for one blast furnace and four stoves, pipe connections, boiler settings, etc. at Midland, Pa.; for two blast furnaces and eight stoves with pipe connections, boiler settings, etc., at Youngstown, Pa.; for one blast furnace and four stoves with pipe connections, boiler settings, etc. at Chicago; for three complete furnace linings at Sydney, Nova Scotia, for two at Bethlehem, Pa., and Buffalo, N. Y. and for one furnace at Wharton, N. J., Detroit, Canal Dover, O., Sharpsville, Pa., and Harrisburg, Pa., besides linings for nine stoves for an eastern iron concern. For beehive coke ovens brick contracts are being filled as follows: 1,700,000 to a concern in New Mexico, 1,000,000 for the Connellsville Basin Coal & Coke Co., 700,000 for the West Virginia Coal & Coke Co., 200,000 for the Perry Coke Co., and 1,000,000 for the Washington Coal & Coke Co. For by-product coke ovens in the Harrisburg district 2,500,000 brick have been sold, and large orders have come from cement manufacturers, one being for complete linings for 15 rotary kilns in Kansas and Texas. Silica, magnesite and chrome brick and all classes of refractory materials are in exceedingly large demand for open hearth steel furnaces, glass furnaces, copper furnaces, etc. On these indications the prediction of an active state of business for some time to come is made.

The Watt Cupola Twyer Co., of Barnesville, O., has made a new contract with the Thomas W. Pangborn Co., of New York City, by which the latter company is made exclusive agent for the Watt cupola twyer for the New England States, New York, New Jersey, Pennsylvania, Maryland, Delaware, Virginia and West Virginia. This gives the Pangborn Co. more territory in which to push the twyer.

The Hobbs Mfg. & Stamping Co., New Orleans, La., is in the market for considerable new machinery which will include metal stamping machinery and presses, die and machine shop tools, etc. The company invites communication with makers of electric soldering irons and asks for catalogs from dealers in equipment used in the manufacture of pressed and stamped tinware, enameled, retinned, and japanned ware, oil and coal stoves, etc.

The American & British Mfg. Co., Bridgeport, Conn., has recently booked orders for a number of pressed steel frames for automobiles. The company intends to manufacture automobiles and will need some new machinery as soon as plans are completed.

The Standard Roller Bearing Co., Philadelphia, Pa., which has purchased $60,000 worth of machinery during the past month, will be in the market within a few weeks for a complete iron and brass foundry equipment including stacks for gray iron castings, oil burning furnaces for brass castings, molding machines, flasks and other foundry apparatus. The crucible steel plant has been completed and placed in operation.

The Allis-Chalmers Co., Milwaukee, Wis., recently awarded contracts aggregating $500,000 for equipment of its six shops now being erected at West Allis. The Niles-Bement-Pond Co., New York, Wm. Sellers & Co., Philadelphia, McDowell, Stocker & Co., Chicago, and Pawling & Harnischfeger, Milwaukee, received the major part of the contracts.

TRADE PUBLICATIONS.

The Avery Stamping Co., Cleveland, has brought out a catalog of shovels and scoops. A large number of different types are listed, including coal shovels, spades, snow shovels, hollow back scoops, etc.

The Bourne-Fuller Co., Cleveland, has issued a booklet on Scott's crucible steels. It gives the different brands of steel made together with prices, and includes a number of tables of weights of various shapes.

C. W. Hunt Co., 45 Broadway, New York, in a catalog entitled "Hunt Automatic Railway," describes its system of running coal back from the front of an unloading wharf to the storage bin or coal pocket. It is an elevated self-acting railway, operated entirely by gravity. The catalog describes the construction and practical operation of the device, together with automatic scales for use in conjunction with it. A large part of the book, which consists of 36 pages, is occupied with illustrations of installations of Hunt machinery.

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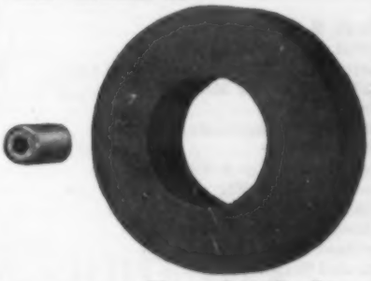

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*Toledo Machine & Tool Co..... 138

Transue & Williams Co..... 113
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Turner, Vaughn & Taylor Co..... 50

Uehling-Decker Co..... 121
†Underwood, H. B. & Co..... 115
*Union Fdy. & Machine Co..... 26
†Union Malleable Iron Co..... 111
*United Coke & Gas Co..... 51
United Engineering & Foundry Co..... 4
†United States Cast Iron Pipe & Fdry Co..... 45
United Steel Co..... 115
Upson Nut Co..... 28

VanDorn & Dutton Co..... 28
†Vandyck Churchill Co..... 13
*Vilter Mfg. Co..... 37
Vulcan Iron Works Co..... 3

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*Warner & Swasey Co..... 7
Washington Coal & Coke Co..... 130
*Waterbury Farrel Foundry & Machine Co..... 17
†Watson-Stillman Co..... 22
Wellman-Seaver-Morgan Co..... 126
West Leechburg Steel Co..... 50
Wheeling Mold & Foundry Co..... 47
†Whitcomb-Blaisdell Machine Tool Co..... 9
Whiting Foundry Equipment Co..... 128
Wickes Bros..... 136
*Wilcox Mfg. Co..... 31
†Williams Tool Co..... 18
Williams, White & Co..... 24
Wister, L. & R., & Co..... 134
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BUYERS' DIRECTORY

Accumulators—

Alliance Machine Co., Alliance, O.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Chambersburg Engineering Co., Chambersburg, Pa.
The Cleveland Machine & Mfg. Co., Cleveland, O.
Mesta Machine Co., Pittsburg, Pa.
Morgan Construction Co., Worcester, Mass.
United Engineering & Fdy. Co., Pittsburg, Pa.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
Watson-Stillman Co., New York City.
R. D. Wood & Co., Philadelphia, Pa.

Air Compressors—

A. S. Cameron Steam Pump Works, New York City.
Curtis & Co. Mfg. Co., St. Louis, Mo.
General Pneumatic Tool Co., Montour Falls, N. Y.
Great Lakes Engineering Works, Detroit, Mich.
Ingersoll-Rand Co., New York City.

Alloys (For Sound Castings)—

Geo. G. Blackwell Sons & Co., Liverpool, Eng.

Annealing Boxes—

Girard Boiler & Mfg. Co., Girard, O.
Meehan Boiler & Cons. Co., Lowellville, O.
J. W. Paxson Co., Philadelphia, Pa.

Anti-Friction Metal—

Phosphor-Bronze Smelting Co., Philadelphia, Pa.

Ball Bearings—

Auburn Ball Bearing Co., Rochester, N. Y.

Band Saw Filing Devices—

New Britain Machine Co., New Britain, Conn.
Long & Allstatter Co., Hamilton, O.

Bars (Iron and Steel)—

American Rolling Mill Corporation, Chicago, Ill.
Beals & Co., Buffalo, N. Y.
Bourne-Fuller Co., Cleveland, O.
Carnegie Steel Co., Pittsburg, Pa.
Globe Rolling Mills Co., Cincinnati, O.
Harrow Spring Co., Kalamazoo, Mich.
Arthur C. Harvey & Son, Boston, Mass.
Lockhart Iron & Steel Co., Pittsburg, Pa.
Republic Iron & Steel Co., Chicago, Ill.
Joseph T. Ryerson & Son, Chicago, New York and Pittsburg.
Scully Steel & Iron Co., Chicago, Ill.
W. H. Thompson & Co., Philadelphia, Pa.
Wm. B. Walter & Co., Chicago, Ill.

Bellows and Blowers—

Hill & Griffith Co., Cincinnati, O.
The S. Obermayer Co., Cincinnati and Chicago.
J. W. Paxson Co., Philadelphia, Pa.
The J. D. Smith Fdy. Supply Co., Cleveland.
Green Fuel Economizer Co., Matteawan, N. Y.

Belt Dressing—

Jos. Dixon Crucible Co., Jersey City, N. J.

Belting—

Chicago Rawhide Mfg. Co., Chicago, Ill.
Gandy Belting Co., Baltimore, Md.
Jeffrey Mfg. Co., Columbus, O.
Shultz Belting Co., St. Louis, Mo.

Bending Machines—

The Atlas Mfg. Co., Fostoria, O.
Alliance Machine Co., Alliance, O.
Bertsch & Co., Cambridge City, Ind.
E. W. Bliss Co., Brooklyn, N. Y.
Chambersburg Engineering Co., Chambersburg Pa.
Cleveland Punch & Shear Works Co., Cleveland, O.
Espen-Lucas Machine Works, Philadelphia, Pa.
National Machinery Co., Tiffin, O.
Niles-Bement-Pond, Co., New York.
Watson-Stillman Co., New York City.
Williams, White & Co., Moline, Ill.
R. D. Wood & Co., Philadelphia, Pa.

Blast Furnace Work—

The Girard Boiler & Mfg. Co., Girard, O.
The Macbeth Iron Co., Cleveland, O.
Meehan Boiler & Construc. Co., Lowellville, O.
Pittsburg Valve, Foundry & Construction Co., Pittsburg, Pa.
Riter-Conley Mfg. Co., Pittsburg, Pa.
Russel Wheel & Foundry Co., Detroit, Mich.
Southwark Fdy. & Mach. Co., Philadelphia, Pa.
The Wellman-Seaver-Morgan Co., Cleveland, O.

Boilers—

The W. P. Davis Mach. Co., Rochester, N. Y.
Dravo, Doyle & Co., Pittsburg, Pa.
The Girard Boiler & Mfg. Co., Girard, O.
Harrison Safety Boiler Works, Philadelphia.
The Hooven, Owens, Rentschler Co. Hamilton, O
Hyde Bros. & Co., Pittsburg, Pa.
The Meehan Boiler & Construction Co., Lowellville, O.
Riter-Conley Mfg. Co., Pittsburg, Pa.
W. W. Shilling, Sharon, Pa.
Struthers-Wells Co., Warren, Pa.
Vilter Mfg. Co., Milwaukee, Wis.

Bolt and Nut Machinery—

Acme Machinery Co., Cleveland, O.
Baird Machinery Co., Pittsburg, Pa.
National Machinery Co., Tiffin, O.
Standard Engineering Co., Elwood City, Pa.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
Williams Tool Co., Erie, Pa.

Bolts and Nuts—

American Iron & Steel Mfg. Co., Lebanon, Pa.
Garland Nut & Rivet Co., Pittsburg, Pa.
Graham Nut Co., Pittsburg, Pa.
Lockhart Iron & Steel Co., Pittsburg, Pa.
Milton Manufacturing Co., Milton, Pa.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Joseph T. Ryerson & Son, Chicago, New York and Pittsburg.
Scully Steel & Iron Co., Chicago, Ill.
Upson Nut Co., Cleveland, O.
Republic Iron & Steel Co., Chicago, Ill.

Boring Bars (Portable)—

H. B. Underwood & Co., Philadelphia, Pa.

Boring Machines (Horizontal)—

J. J. McCabe, New York City.
Niles-Bement-Pond Co., New York.
Pawling & Harnischfeger, Milwaukee, Wis.
Pratt & Whitney Co., Hartford, Conn.

Boring Tools (Adjustable)—

Armstrong Bros. Tool Co., Chicago, Ill.

Boring and Turning Mills—

Baird Machinery Co., Pittsburg Pa.
Bickford Drill & Tool Co., Cincinnati, O.
The W. P. Davis Machine Co., Rochester, N. Y.
Espen-Lucas Machine Wks., Philadelphia, Pa.